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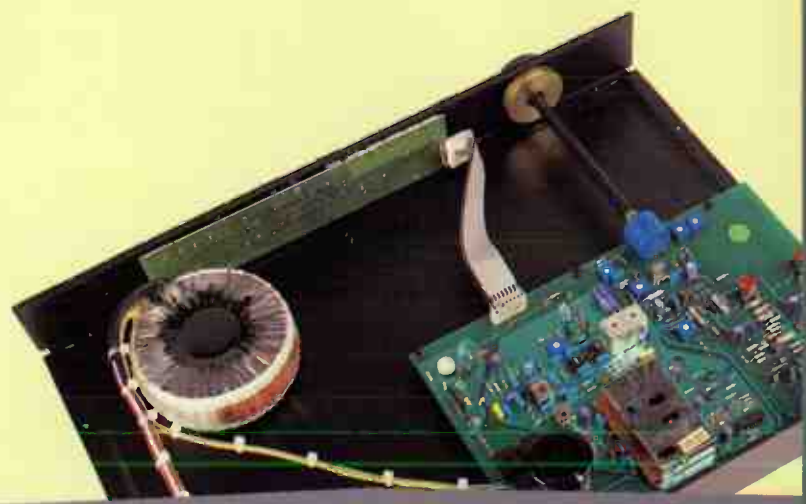
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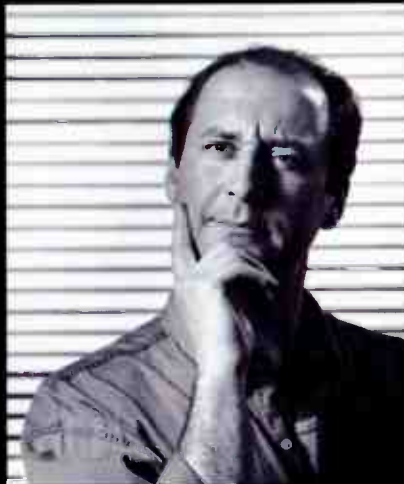
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Lyric Hi-Fi
84 Bridge St, Portadown, Co. Armagh Tel: 0782 358059



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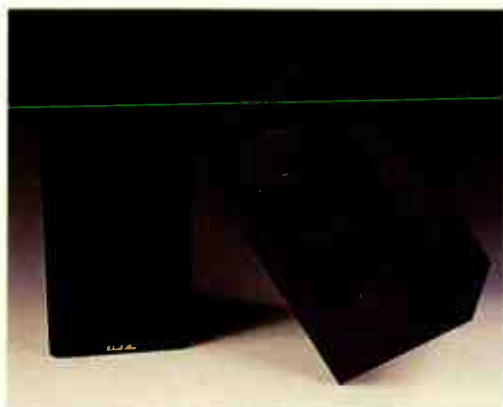
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Distributed by
World Radio History
1000 Lakeside Drive
New York, NY 10017
Tel: (212) 512-1100

Originated by
World Radio History
1000 Lakeside Drive
New York, NY 10017
Tel: (212) 512-1100

Printed by
World Radio History
1000 Lakeside Drive
New York, NY 10017
Tel: (212) 512-1100

AUDIO PUBLISHING LTD.
1000 Lakeside Drive
New York, NY 10017
Tel: (212) 512-1100
Circulation: 1000 copies per month

MAIL ORDER
Tel: 011-246-0267 (24 hours)

Subscription Rates
Tel: 011-246-0267
Overseas Surface: £25 Annual; £45
Overseas Air: £50 Annual; £90
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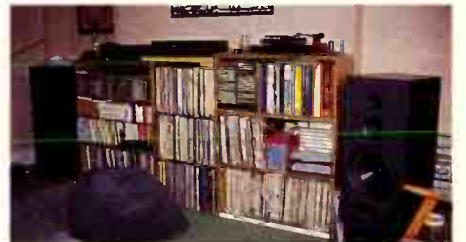


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Cambridge Systems Technology Limited, Spitfire Close, Ermine Business Park, Huntingdon, Cambs. PE18 6XY. Tel 0480 52521

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NEW AMPS

From Harman Kardon, the HK 1200 at £279 and the HK 1400 at £399 are both minimalist line level amplifiers. By doing away with tone, balance, loudness and speaker switching they should offer very high quality amplification for line level sources. The '1200 produces 25W and the '1400 40W.

HARMAN AUDIO

Unit 2, Borehamwood Ind. Park,
Rowley Lane, Borehamwood,
Herts. WD6 5PZ.
Tel: 081 207 5050.



THE WAIT PAYS OFF



...for anybody holding their breath for the new Audio Innovations phono

amp. The P2 phono stage pre-amp is designed for use as a stand alone unit for use with any line level preamp or to complement the 'Innovations L2 line level preamp.

AUDIO COMPONENTS LTD., Albany Court, Albany Road,
Weymouth, DT4 9TH. Tel: 0305 761017

NEW NAKAMICHI

Those nice cassette deck people have come up with two new amps and a tuner for your delectation and delight. An 80W into 8ohm unit at £649.95, the IA-1; a milder beast, the IA-2, weighing in at £549.95, and the 30 preset ST-2 FM tuner at £349.95. We hope to put some of these through their paces soon...



NAKAMICHI B&W UK Ltd,
Marlborough Road, Lancing, West Sussex. BN15 8TR. Tel. 0903
750750

ORELLE ORATORS

...are a new departure for the company, being compact two-way 'speakers. This rounds their range of products into a complete system. The Orators are available in black ash or walnut finish for £699, or rosewood for £799. Also new is the CD-260 one box CD player at £999.



ORELLE HI-FI, Unit 11, I-MEX House, 6 Wadsworth Road, Perivale, Middx. UB6 7JD.
Tel: 081 810 9388



THE CRUSADER RETURNS



RUARK have brought out the Crusader II, promising improved crossovers, better controlled bass, and smoother treble, and a price tag of £1,495 inc VAT.

R U A R K
ACOUSTICS Ltd.
Unit 9, Annwood
Ind. Est. Arterial
Road, Rayleigh,
Essex. SS6 7UA.
Tel: 0268 728890

THE MYSTS OF TIME



...have rolled back and revealed the 'new' Tmr tuner. This is the first product to bear the MYST name for five years and the price is still £208.00 exclusive - VAT seems to be the only thing which has changed! If you want one, though, be quick; this is a limited edition, and there will be nothing more...

...except that ATD of Italy have been granted the privilege of using the MYST name on their products, which should be on the market, at least in Italy, next spring.

MYST Ltd, Whitehill park, Weobley, Hereford. HR4 8QT. Tel: 0544 318800

or -

ADT, snc di J Szall & Co. Via Plinio 43, 20129 Milano, ITALY.

RESPONSIVE ProAc

ProAc have announced a new addition, the Response Four 'aimed at discerning high end listeners', boasting (and I mean boasting) two bass units, two midrange, and one (wot? just the one?) tweeter. All this on a ProAc name speaker. Yours for only £11,995, or £12,995 for the really swanky finishes.

PROFESSIONAL
ACOUSTICS, 130-132
Thirsk Road, Borehamwood,
Herts. WD6 5BA. Tel: 081
207 1150.



KELVIN'S CABLES

Kelvin Audio Cables have just come up with a new speaker cable at around £2.40 inc. VAT per metre. The K120 uses 56 strands of high-quality copper in an effort to further improve sound quality over their established K80 cable. Aside from their sonic virtues, these cables will be available in both black and white.

Kelvin Cables have no connection with Kelvin Labs.

KELVIN AUDIO
CABLES, 2a Gardenhall,
East Kilbride, G75 8SP.
Tel: 03552 26522



GETTING INTO YOUR MUSIC

VITAVOX, purveyors of horn loudspeakers to the rich and comfortable, have launched a new model. The System 191 speaker aims to effectively place the listener in the horn mouth, since the horn is arranged in 'such a way that the walls and floor of the room form the final expansion of the horn'. Are these chaps saying that they can raise the roof? And have they calculated for the six foot Yucca palm in the corner? The 191's have a power handling capacity of 100W and a



frequency range of 30Hz - 18kHz. This year the speakers are modelling a chic walnut veneer with a slimline bronze grill, and are weighing in at a svelte 100kgs. The only detail we don't know yet is the price.

VITAVOX, Secomar Ltd. Honeypot Lane, Stanmore, Middx. HA7 1BE. Tel: 081 952 5566.

GLORIANA AT LAST

After a wait of 40 years, the first release of Britten's Gloriana is finally available from DECCA on ARGO CD No. 440 213-2. This work has remained unregarded for some time because, instead of choosing to eulogize the new monarch in this celebratory composition for the Coronation in 1953, Britten concentrated on the personal tragedy of the first Queen Elizabeth. An accompanying book on the work, logically entitled 'Britten's Gloriana' is available for £25+p&p from publishers Boydell & Brewer.

THE RECORDING: DECCA RECORDS, 1 Sussex Place, London W6 9XS Tel: 081 846 8515

THE BOOK: Boydell and Brewer, PO Box 9 Woodbridge, Suffolk, IP12 3DF. Tel: 0394 411320

NEWS FOR VINYL VULTURES

Mini-system merchants AKAI have come up with two new record decks, designed with the help of British company REGA, for inclusion in their mini-systems. The AP MX570 will retail at around £100 and the better specified AP A950 around £180. The AP A950 will come with a fitted cartridge derived from Audio Technica's AT95E.

AKAI (UK) Ltd. Haslemere Heathrow Est, The Parkway, Hounslow, Middx. TW4 6NQ. Tel: 081 897 6388



GOLDRING'S ELEKTRA

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GOLDRING PRODUCTS Ltd, 8 Greyfriars Road, Bury St Edmunds, Suffolk. IP32 7DX. Tel: 0284 701101

SOFTER LOOK FOR ARCAM

Arcam's new range, the Alpha 5 series, incorporates the new look used in the recent Delta 290 amp and 280 tuner: sweet, sleek, and expensive.

The 40W Alpha 5 amp will retail at £229.90. There's a matching 16 preset tuner at £219.90 and the Alpha 5 CD player at £449.90. The three come as a system for £899.70, or with the new Alpha 6 £329.90 amp instead, giving remote control of volume, for £999.70.

A & R Cambridge Ltd. Pembroke Ave. Denny Industrial Centre, Waterbeach, Cambridge. CB5 9PB. Tel: 0223 440964

STOP PRESS

TANNOY

The D100 loudspeaker, the next addition to Tannoy's Definition series, should hit the shops as you read this issue. It is a stand mounted, single-driver, dual-concentric 'speaker similar to the D700s.

HARMAN AUDIO HAVE MOVED TO -

Harman Audio, Unit 2, Borehamwood Ind. Park, Rowley Lane, Borehamwood, Herts. WD6 5PZ. Tel: 081 207 5050.

DCC GOES WALKIES

Those cunning Philips people have managed to bring out a new personal stereo based on the Digital Compact Cassette, plus a whole pile of in-car and home DCC equipment. The DCC130 personal has "special error detection circuits" (although they don't actually mention error correction!) to make this player shock-proof. You can also read while you jog, because it has the usual text info as well. Expand your ears and your mind for a cool £400. You have to pay to be chic!

PHILIPS, City House, 420/430 London Road, Croydon, Surrey. CR9 3QR. Tel: 081 665 6350



PEAR MOVES

PEAR AUDIO, distributor of SHAHINIAN ACOUSTICS loudspeakers, have moved. Their new address is -

PEAR AUDIO, 3 Northumberland Mews, Alnmouth, Alnwick, Northumberland. NE66 2RS. Tel: 0665 830862.

RUBBER RINGS FOR GARRARD

Loricraft Audio are now supplying a special damping ring which fits around the platter of Garrard 301 and 401 turntables. At around £5 including p&p they have to be worth a try.

LORICRAFT AUDIO, 4 Big Lane, Goose Green, Lambour, Berks. RG16 7XQ. Tel: 0488 72267

AUDIO JUMBLE!

One last thing, there'll be an 'Audiojumble' sale of vintage and modern hi-fi at the Victoria Hall, Southborough, Tunbridge Wells, Kent, on Sunday 19th September. Stalls available.

For details, telephone John Howes on 0892 540022

- **Alderley Edge** Cheshire Aston Audio 4 West Street SK9 7ES Tel 0625 582704
- **Amersham** Bucks Dejac Hi-Fi 21 The Broadway HP7 0HL Tel 0494 431290
- **Belfast** N Ireland Lyric Hi-Fi 163 Stranmillis Road BT9 5AJ Tel 0232 381296
- **Birmingham** Five Ways High Fidelity 12 Islington Row Edgbaston B15 1LD Tel 021 455 0667
- **Birmingham** Griffin Audio 94 Bristol Street B5 7AH Tel 021 692 1359
- **Bishops Cleeve** Herts The Audio File 27A & 40 Hockerhill Street CM23 2DW Tel 0279 506576
- **Brentwood** Essex Brentwood Music Centre 2 Ingrave Road CM15 8AT Tel 0277 221210
- **Bury St Edmunds** Suffolk Bury Audio 47 Churchgate Street IP33 1RG Tel 0284 724337
- **Chichester** Sussex Chichester High Fidelity 7 St Pancras PO19 1SJ Tel 0243 776402
- **Christchurch** Dorset H.A.T.V. 131 Barrack Road BH23 2AR Tel 0202 473901
- **Croydon** Surrey Spalding Electrical Ltd 352/354 Lower Addiscombe Road CR0 7AF Tel 081 654 1231
- **Edgware** Middx Musical Images Ltd 173 Station Road HA8 7JX Tel 081 952 5535
- **Exeter** Devon Howards (Exeter) Ltd 90/91 Sidwell Street Sidwell Street Roundabout EX4 6PH Tel 0392 58518
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- **Nottingham** Notts John Kirk 70 Chilwell Street Beeston NG9 1FQ Tel 0602 252986
- **Oxford** Oxfordshire Horns 6 South Parade Summertown OX2 7JR Tel 0865 511241
- **Oxford** Oxfordshire Westwood & Mason (Oxford) Ltd 46 George Street OX1 2AN Tel 0865 247783
- **Penrith** Cumbria Lakeland Home Music Fair Place Watermillock CA11 0LR Tel 0768 486235
- **Portsmouth** Hants Jeffries Hi-Fi 29 London Road PO2 0BH Tel 0705 663604
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World



LIGHTNING STRIKES

It is interesting to note that in all your advice on aerials for hi-fi tuners there is nothing mentioned regarding protection against voltage surges or build-up of static charges.

As an underwriter for a very large insurance company I am aware of the considerable number of claims we receive in the summer months for TVs, videos and hi-fi equipment, and even cordless phones, damaged by nearby lightning strikes during thunderstorms. It would seem that we have no recognised standard for earthing TV and V.H.F. aerials in this country, yet I well remember when at a very young age I visited my grandparents both of whom had radiograms with aerials hung across the roof between the chimneys. The aerials terminated in a switch which in one position lead the signal to the radiogram and in the other switched the aerial to earth via a substantial earthing rod. It was recommended that this was switched to earth when the set was off. With even the average household having a video and TV worth £800 and the hi-fi family having a system of at least equal value, losses can be quite high! I always try and remember to remove aerials from videos and

the tuner in thundery weather.

I understand that there could well be an EEC standard on aerials very shortly, and earthing will be required.

**H.P.H. Ebury
Chelmsford,
Essex.**

We understand the dangers of lightning strikes to electrical equipment. A fascinating book on this subject resides in our library. It describes how lightning, in an attempt to get to ground, jumps from one metal object to another within a house, smashing through walls, ceilings and floors in the process.

A lightning bolt contains a massive amount of electrical power. The field is strongest directly below a thundercloud, reaching some 20,000Volts per meter but, even 5km away, it may be as much 5000V/m. When lightning strikes the average current amplitude is around 25,000amps and the maximum value recorded is around 270,000amps.

Obviously if this kind of power comes into contact with electrical equipment, or for that matter anything else, it will be destroyed. Having a switched earth as you describe may well avoid damage to expensive

audio equipment and some form of protection should be considered by all readers. Thanks for your advice and reminder; we'll update our aerial info shortly. **DB**

THE SPARKLE OF SILVER

I am writing just to thank you for your reply to my letter, which has been published in the June issue. The title you gave it made me laugh enough to trigger my interest in reading on.

In the meanwhile, I succeeded in markedly improving my system by means of some simple - but definitely not really cheap - adjustments which I mention should you find any interest in them.

The Audioquest Turquoise has been replaced by the Audio

Synthesis Silverblue.

Worth every penny out of its £88 price tag (0,75 m. + WBT plugs, purchased by mail from the manufacturer), this solid core silver cable unmasked the midrange beyond any expectation, bringing voices a little bit forward and vastly improving clarity and detail. Gone is also some high volume harshness. Switching back to the AudioQuest is like wrapping the speakers in cloth.

The Rotel 965 has been replaced by a Meridian 200, and there came the real surprise. Imaging, low level detail, drum hits, bass guitar chords - all given a proper CD recording, instruments "are" in front of you much more than before. It seems very close to

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Letter of

DISCOVERING CLASSICS

As someone who has been buying Hi-Fi World for the past two years, I wanted to write to say how much I look forward these days to the beginning of each month and the publication of the magazine.

What I particularly enjoy reading in Hi-Fi World are the articles on classic/vintage hi-fi equipment and it's thanks to your magazine that I am writing this letter while listening to the sublime sound coming from a Leak tuner and decoder (obtained from Haden Boardman) and which has ousted a perfectly good modern digital tuner I had been using. I cannot begin to describe the pleasure I am now getting from listening to and looking at the Troughline.

The point of my letter is this: until around two years ago (before I purchased my first hi-fi separates system) I had never heard of names like

Quad, Leak and Radford. Please do not imagine that it is only older readers who like to read about vintage valve equipment. Please continue to publish articles wherever possible on vintage equipment as well as the modern.

The purchase of the Leak Troughline prompted me to dig out old issues of Hi-Fi News from the late 50s and early 60s in the central library in Belfast and I was able to photocopy the original Hi-Fi News review of the Troughline II published in 1962. Looking through the adverts and articles I came across the names of long forgotten (presumably) manufacturers such as Lowther, Whiteley and Jason.

Is there any possibility of Hi-Fi World doing articles on the history of specific hi-fi companies? I'd love to find out more about the history (and sadly the demise) of Leak and other companies and I'd be keen to read about what these



ewrites

the enthusiasm given by a live performance. I did not buy the Orelle transport (I have already got the DAC) since it was not yet available, but I will audition it as soon as possible.

I am afraid my previous letter sounded like a put-down of the Exposure. Maybe I wrote it in a bit of a hurry, after two or three weeks during which my system sounded horrible, and the local dealer was not able to provide any remarkable help. I must add that some time later I received from Exposure a copy of a review published in *Stereophile* which immensely helped me in taming the few XV faults which - by chance - were the same I had pointed out.

Well, at least according to my taste, I believe that the

Exposure XV is one of the best integrateds I have heard. It is also well beyond its price, and I think an Exposure pre-power combination will be on top of my list later this year. Maybe you would not agree with my point of view, but try listening to the 8000A just after the XV and let's talk about it.

In the meanwhile, *Hi-Fi World* won a lifetime subscription (after all this reading, you really deserve it. Don't you?).

Respectfully and indefinitely yours,
**Mauro Benedetti
Rome,
Italy.**

We have just designed and built our own solid silver interconnect, which is for sale through our mail order section. The benefits we have experienced with solid silver cable are similar to what you describe, notably a smoothness

and an increase of detail and openness over copper equivalents. Because most of the signal is conducted through the surface skin of a cable we will also be offering a cheaper alternative using silver plated copper. This has similar properties to that of solid silver, but is considerably cheaper making it excellent value for money. **DB**

SINGLE ENDED ARGUMENT

There is no mystery about why single-ended amplifiers sound better than push-pull amplifiers: it is well known that, given the choice, most people prefer the addition of a moderate amount of low-order harmonic distortion. The push-pull triode amplifier is, after all, composed of two single-ended amplifiers, with a common secondary, which cancels most of the pleasant second-order distortion which each half produces. The extra driver circuitry is merely the last in a long line of many comparable operations from the microphone onwards.

Surely, if after passing through several hundred transistors in the recording process, there is a difference between valve and transistor pre/power amplifiers, it must be that the valves are adding something and not that the last few transistors are losing it. I think that this preference for single-ended designs confirms this interpretation (although the psychological impact of the price tag probably has a part to play).

It is not necessarily true that the best sounding amplifier is the most accurate: but hi-fi, by definition, is about accuracy.

**R A Woolley
London.**

After the signal from a microphone has passed through several hundred transistors it is stored on a format such as a CD. From this point onwards hi-fi by definition says that we should do our best to conserve this original information. If you listen to the difference between CD players, amplifiers and 'speakers it is clear that a great deal can be lost along the final part of the chain. From our, admittedly limited, knowledge

of single-ended amplifiers it does appear that they are better at preserving the original than push-pull designs. Our argument is for single-ended operation, not against transistors. For our reader's system this month we visited Geoff Hill of Goodmans Loudspeakers Ltd who has for many years been enjoying a single-ended transistor amplifier. This offers a similar degree of detail and emotion as did the Yoshinos. By the way, Tim de Paravicini also made a transistor version of the Yoshino alongside the valve version, which we have yet to hear. **DB**

Your argument is conventional and plausible, but not indisputable. Like you, I do wonder at times how it can be that after so much signal processing through solid state circuits, reproduction through a valve amplifier can appear better. Superficially, this does seem to suggest that the valve amplifier is capable of euphonic enhancement. However, it isn't so simple.

For a start, that people prefer a limited amount of second harmonic is an assertion few people are in a position to question - it is not a fact. I spend my life measuring distortion (on an ultra fast and accurate FFT) and listening to the products that make it. I can assure you that second harmonic doesn't enhance; in large quantities it only changes timbre. Second harmonic is not the answer.

Further problems with your argument arise when a valve amplifier better reveals the properties of a bad recording, as good modern ones commonly do. This strongly suggests they are more transparent to the source. Good ones also reveal far more detail. Even some recording engineers now acknowledge that valve stages, especially early on in the signal chain, improve recording quality. Heavens, Polygram now use a valve mixing desk and mic pre-amps at times.

And whilst all those circuits in the recording process might commonly contain transistors, they don't contain power amps driving a dynamic transducer, something that makes hi-fi power amps a unique case.

I sympathise with your views; it would appear at first sight as if valves merely enhance. Yet when you have the experience, as we com-

Continued on page 17...

The Month

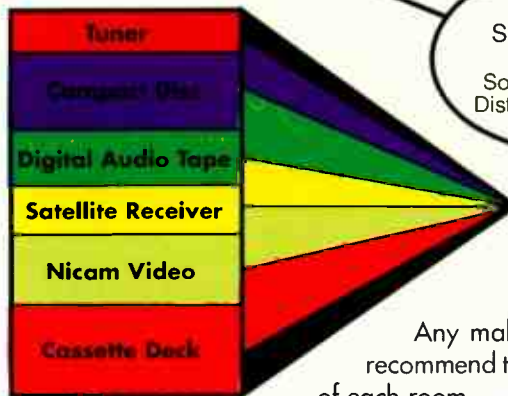
companies were like in their heyday and any classic products they were associated with. I realise that *Hi-Fi World* cannot dwell too much on the past (although people don't seem to have any problem dwelling on the past when it comes to vintage/classic cars!) but there is clearly an interest among *Hi-Fi World's* readership for articles on vintage equipment. **Michael Winnington
Belfast N.I.**

At long last I have managed to get my hands on a Leak Troughline which is at this very moment being restored to full glory by Graham Tricker of GT audio. I, like you, had not come across the Leak Troughline until reading all about it amongst the pages of *Hi-Fi World* some time before I joined the team. Since then I have been trying to find one at a price I could afford, and it was only

recently that this opportunity arrived. I spend a lot of time listening to the radio, mainly looking out for new and interesting music (it's too expensive to take a risk on a CD these days) and catching live concerts that I cannot find the time or money to go to.

From what I have heard of Noel's Troughline they can sound pretty special, and in the near future I hope to be able to add one of Tim de Paravicini's decoders to improve the performance even further.

I agree that we should do more vintage equipment, at least one article per month, but it takes a long time to organise. I think we haven't done too badly recently with the Garrard feature in May and the American tuners in June. When I get my Troughline from Graham Tricker and fit Tim's decoder we will try and write more on Leak. **DB**



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...continued from page 15

monly do, of replacing a top quality solid state amplifier with a good valve design and hearing so much more as a result, then those age old arguments about second harmonic, and all that, suddenly become inadequate to explain what is going on. **NK**

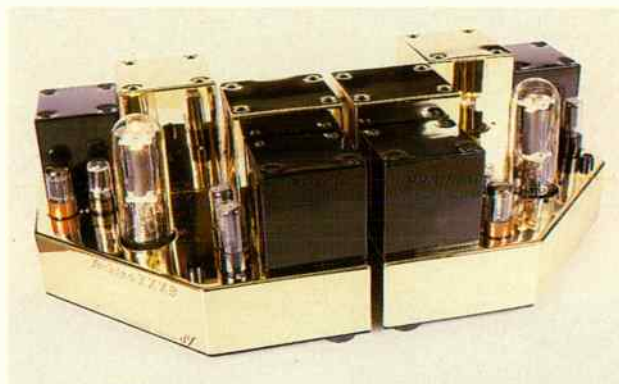
REASONS FOR SINGLE ENDED

I read with interest your piece about single-ended versus push-pull output stages in valve amplifiers featured in Hi-Fi World's July issue, and I am very pleased to see that at last somebody is re-starting this age-old debate.

To this end, I would like to offer what we consider to be the reasons that may give cause to the considerable sonic superiority that well designed single-ended amplifiers enjoy over their otherwise seemingly better push-pull counterparts.

- 1) No zero crossing point disorders, as the output is purely an amplified version of the input signal.
- 2) Ultra simple signal path, with only 2 or three gain-stages.
- 3) Absolutely pure and unblemished Class A operation.
- 4) No phase splitter, which avoids the imbalances caused by time domain differences between the two halves of the wave-form, likewise, the d.c. imbalances in the output transformer that are always the result of slightly different plate currents are not present, either.
- 5) Better damping factor, because in the single-ended output stage the ratio of the valve's plate impedance to the load impedance is generally about 4 times better than its push-pull counterpart.
- 6) Greater dynamic power per watt than push-pull.
- 7) The d.c. bias creates a permanent magnetic field in the output transformer of an single-ended amplifier and prevents the flux from going into remanence, in a push-pull (or any other transformer that operates on zero-resultant bias), there are considerable no-load non-linear magnetisation currents demanded from the output valves

by the coercive forces or the reverse magnetic field required to reduce a magnetically saturated material from remanence to zero magnetic induction, this non-linear hysteresis loop creates considerable "lag" and instability between the "push" and the "pull" parts of



the operation, and add to the problems already created by the phase-splitter.

8) In not cancelling the second harmonic distortion from the output stage, the natural harmonic relationship present in the input signal is maintained. In the push-pull stage you effectively "unearth" the third and higher harmonic components, all of which affect the zero crossing point, by cancelling the second harmonic distortion created by the output stage.

To appreciate the importance of this, you have to look at how the human hearing mechanism works; our hearing is far more sensitive to duration and delay phenomena than to small deviations in amplitude. This means that even minute changes in distortion pattern and behaviour in different parts of the band-width of an amplifier are very detectable by human hearing, whereas higher overall levels of distortion, as long as they remain constant and even over the band-width, are not that audible. It is changes in distortion pattern over frequency that disturbs the ear rather than the overall level of distortion.

As a general comment, the audio industry's pre-occupation with amplitude related measurements go completely against the grain of the requirements of the human hearing, which is much more zero crossing point sensitive than generally considered. These are the conditions under which feedback is considered a benefit. Are we really so lazy in our approach to this that we cannot get it into

our heads that Humpty Dumpty will never be the same after he has been broken?

You mention in the heading to the PP-SE article that the Ongaku and the Yoshinos are the only single-ended amplifiers in the world. This is not correct; we have for the past three years

been marketing the Audio Note Neuro (parallel single-ended 2A3s) and the Kassai/Kegon (parallel single-ended 300Bs).

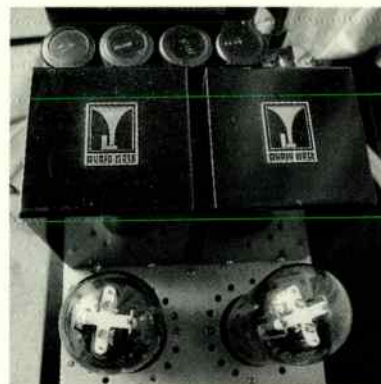
In Japan there exists a great number of manufacturers of single-ended amplifiers, like Shindo, Audiotekne, Audio Professor, U-BROS and many more. Furthermore, we at Audio Note here in the UK released about 3 months ago a version of the OTO integrated amplifier and its power amplifier in parallel single-ended configuration, dubbed the OTO SE and the PI SE. These are to the best of my knowledge the first parallel single-ended pentode amplifiers ever introduced into the market. We believe the benefits of the single-ended output stage are amply demonstrated in these products.

On a different note, in your reply to Mr. Hugh Gabriel you state that "there are no valve-amp compatible loudspeakers on the market". It is not nice to be forgotten, and may I therefore politely remind you that we have been making loudspeakers with efficiencies of well over 90dB for over two years now, starting with the AN-K at 90 dB, the AN-J at 93/94 dB and the AN-E at 95/96dB. Hi-Fi World reviewed the AN-J/B (93/94dB) in the June 91 issue! But apart from our loudspeakers there are a few others, like Lowther, Triangle and the Homing Agathons which are all examples of loudspeakers with high efficiency and good load behaviour, and I feel we all deserve a mention in this regard.

You know how much I applaud your "drive" towards valve amplifiers (and now single-ended) and thereby efficient, easily driven loudspeakers, and the renewed interest your efforts are creating, but it would be equally nice if you would recognise who brought these technologies to light again after many years of silence in a near certain grave.

There has for many years been a subculture amongst the more knowledgeable engineers, experimenters and audiophiles, who, primarily in Japan, have been investigating, experimenting and discussing the advantages of zero-feedback, single-ended output stages, efficient horn loaded loudspeakers and many other such related subjects. In relation to the broader market, the first real breakthrough for these technologies came with the recognition granted to the Audio Innovations First and Second Audio Amplifiers, and finally the Ongaku which really opened people's eyes to the real quality of the single-ended output stage and put it all firmly back on the agenda. In the rush to join the "bandwagon" as it were, this should not be forgotten.

I sincerely hope that Hi-Fi World will stay above the fray of commerciality and demonstrate the kind of vision and impartiality necessary to act as the referee, as more and more players join the niche market playing field valve amplifiers occupy, and perhaps, one day soon, together



we will be able to challenge the transistor wielding, scope-jockey brigade, with proof that they have been wrong all these years. The ultimate beneficiary from this result would, in my opinion, be music.

The Defence rests its case.
Peter Quartrup
Audio Note Co.

The Neuro and Kassai/Kegon
continued on page 19 ...

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...continued from page 17

are both parallel single-ended amplifiers and do not use one single triode as an output stage, such as Ongaku and Yoshino do. All the same we apologise for failing to recognise these other single-ended amplifiers of yours. Perhaps we could arrange a review of these at some time to enable us to continue our research of single-ended amplifiers? **DB**

I didn't mention your other amps because I knew for certain that by not doing so I'd get a massive letter from you in response, which would part fill the magazine and give me a welcome day off. Taa! Now where's the cosy? **NK**

UPGRADE YOUR EARS

I read, with interest, the letter from Peter Johnson in your March issue; he says that he only has good hearing in one ear.

I'm similarly afflicted with middle ear deafness since childhood (one ear only) and recently (I'm now 60) I tried a modem hearing aid for listening to music. On the basis of a short demo I can recommend this rather novel upgrade. Try the NHS before thinking of going private, these can cost around £500 and appear to be no better than cheaper versions of the same thing.

Middle ear deafness means the small bones are not working, but provided you have normal inner ears and what is called bone-sound conduction, then a hearing aid is a good indoor item and is probably no worse cosmetically than using headphones.

I would not use one outdoors or for continual use, however all the time I can still hear with one ear!

My main hi-fi gear consists of a Marantz CD94-II, Acoustic Research Legend deck with Stilton ATF3 through a Moth Pre amp, Pioneer A400 and into Tannoy DC 3000 speakers in a room 22ft x 14ft X 10ft. I'm well pleased with this combo after going through various items in the last few years.

I never need to go past the 9 o'clock position on the volume, usually 7-8 with exceptional results in jazz, female vocalists and classical piano, mainly.

Hope this info is of use.
Yours faithfully

M Dowd
Grange over Sands,
Cumbria.

PS I am very pleased with your magazine. A good mix of

practical and common sense writing.

BITS AND PIECES

The Lux Monarch valve amp (in Roy Clarke's amazing collection) is, I believe, a LX33 a.k.a. Fujitech A1033 imported into the U.S.A. by Monarchy Eng. It was in kit form and could be built in Triode 15 watt or

Pentode (ultra linear) 30 watt. Triode operation was far superior. I bought a LX33 three years ago and converted it to triode operation, but have now sold it. If Mr Clarke or anyone else is interested I have the diagrams and can advise on the changes.

Your comments on Yoshino and Ongaku being the only single-ended amps available is not quite right. Audio Note also have the Keron, Kassi and Neiro - these are all single ended.

Is there any enthusiast out there who could help me re-build my Syrinx PUI pickup arm? New bearings mainly, as I build valve amps, including a very quiet valve head amp, I could repay the favour in kind.

On the subject of quiet valves, the headamp is very critical of valves. The ones I use

are Sovtek 6922, a 6DJ8/ECC88 substitute. These were supplied by Audio Note and are much better than any others I have tried, including Golden Dragons, as well as being less expensive. Incidentally I believe the pin-out for the ECC88 is in error, pin 9 is the screen, not the heater centre tap. You have to run these at 6V. The Digt DAC

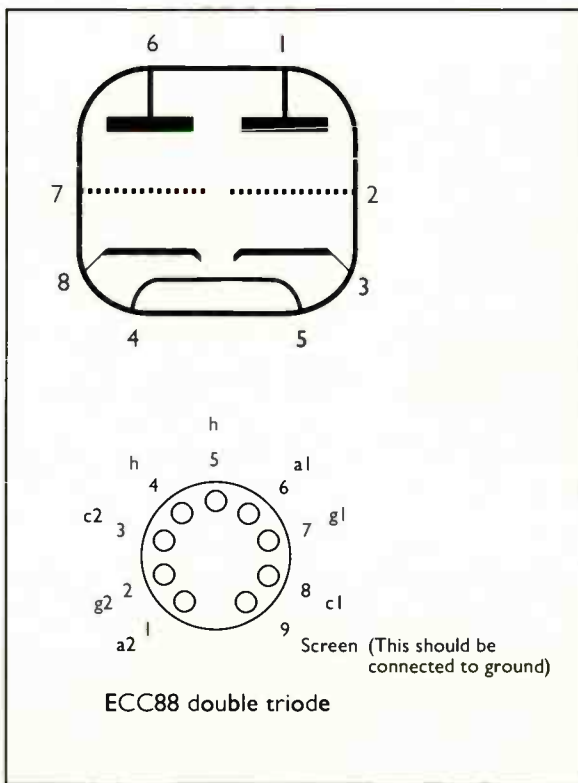
mounted on it). Half way through he stopped, listened, and yes you've guessed, no more rumble. Actually Mr Sugano of Koetsu fame uses a 401, so it must have some kind of magic. How about a CD transport and a pickup arm for future DIY projects?

Finally, Tim de Paravicini is correct about the single-ended amps linearity at low levels due to the air gap in the output transformer. I initially thought the opposite would be true, also though, no phase splitter is perfect and imbalances do, I'm sure, result in cancellation of musical information as Noel stated.

Gordon Welford
Cleveland.

OOPS! You have indeed spotted an error in my marking of the pins for an ECC88. As you say, pin 9 is in fact the screen (or shield) and not the heater centre tap. The 6.3V heater winding should be applied across pins 4&5.

We know about the Sovtek 6922 and in fact will be supplying it with the valve pre-amp kit. We did not mention this Military spec version of the ECC88 at the time because we did not know of a regular supplier, but as you have pointed out, Audio Note can supply these excellent valves. **DB**



Naim entered the tuner market and made their mark long ago with the respected NAT01, something of a progenitor in my view. It set, and it has maintained, a standard of sound quality that remains unsurpassed in solid state tuners. In a nutshell, an 01 gives an unusually smooth, almost warm sound, with superb stereo imaging and an excellent sense of stage depth. Tuners often lose this vital perspective, erased I suspect by the weight of signal processing that goes on. It's where the simplicity of old valve tuners proves to be a great advantage and it also provides a lesson in the compromises involved in tuner design.

Naim followed the 01 with the less expensive NAT02. It lost little except image sharpness and general staging tidiness. Now they are delivering the new NAT03 to their dealers. Priced at £499, it aims to bring the unique sound of the 01 and 02 down to a price level that'll compete with the likes of the new Quad 66FM and the Audiolab 8000T.

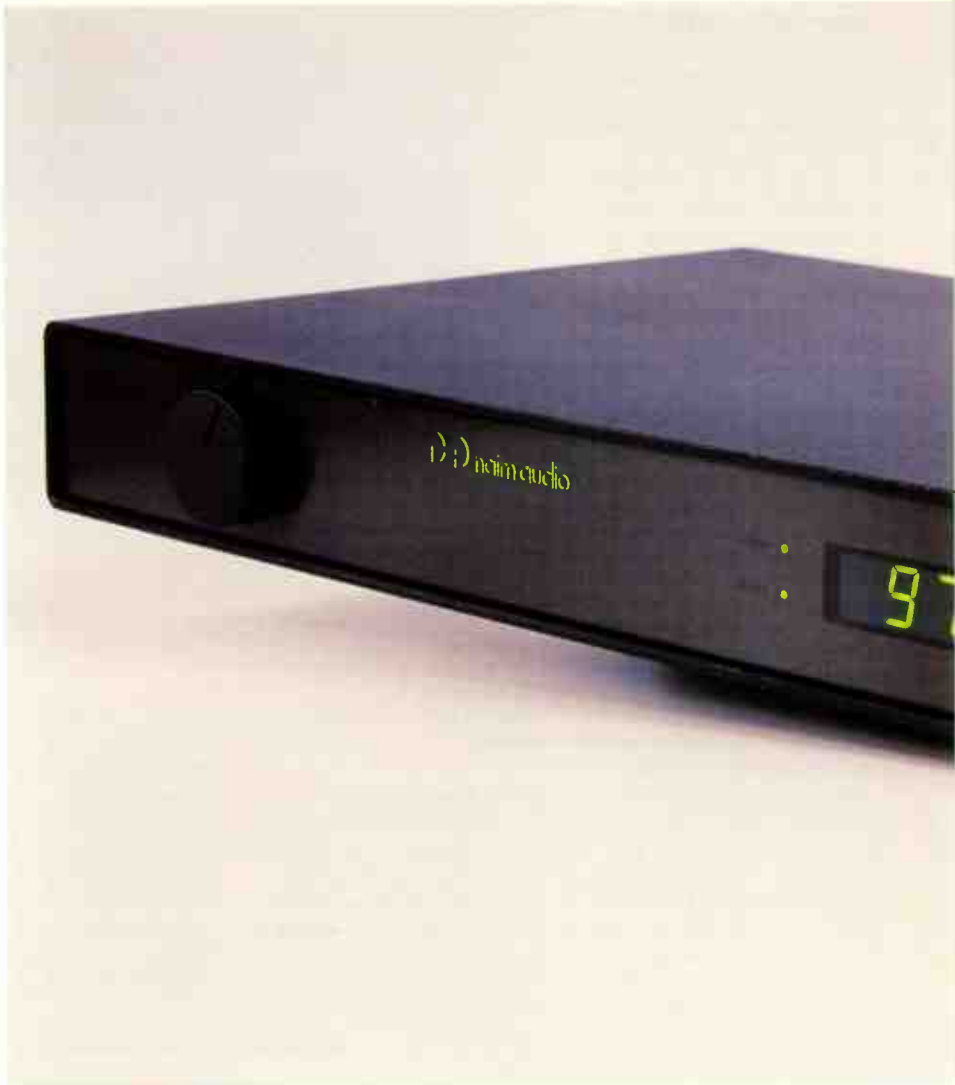
Simplicity

We've reviewed both of these new tuners and they're extremely impressive performers, available at a price little above the best from Japan. It's into this market niche that the 03 is pitched, head on against some effective competition.

The NAT03 is as determinedly blank faced as its bigger brothers; Japanese design engineers must wonder how Naim can market a product of such apparent simplicity and get away with it. The power switch lies next to the captive mains cable input on the rear panel, where it cannot be easily accessed. Tuners draw little power and this one is obviously meant to be left on, which is fine as long as there's no feedthrough on the amplifier's input selector switch, or a background twitter may be heard through the loudspeakers. Whilst rear mounted power switches are convenient for manufacturers, they can be inconvenient for users.

The NAT03 is housed in a strong but simply styled steel case, finished in dark grey. A grey acrylic front panel is cleverly screen printed to allow green light to discreetly seep out from around a Naim Audio logo, a touch that adds a little bit of magic to the 03's otherwise stark appearance. A four-digit numerical read-out of frequency is the only tuning aid, but whilst the tuning knob can be swung through a fair arc before the unit goes off-station, tests showed that performance stays fairly stable across the on-tune window.

This is a manual tuner, not a synthesiser type like the Aura TU-50 for example; it has no pre-sets. Tuning is carried out by a ten-turn potentiometer, which gives a smooth feeling action with some mechanical resistance to movement, not a spin-wheel action. The tuning knob has a rubber periphery, which is pleasant to the touch, and tuning is a reasonably speedy process, until you want to get from Radio 2 down at the bottom end of



A WARMER FROM

Naim have just introduced the new NAT03 tuner

the band, up to Melody Radio at the top (why you'd want to spend so much time going from Jim Reeves to Joe Loss, I don't know; I offer it only as an example - not as a recommendation!). In this circumstance, some serious twiddling becomes necessary and even the creaky spin-wheel of my ageing Leak Troughline leaves the NAT 03 standing. As with the NAT 01 and 02, which have identical tuning systems, the 03 is better suited to those who have a few favourite stations, rather than inveterate wave riders.

Besides, the signal strength indicating system is probably a little too sparse for the latter. Although Naim cleverly incorporate signal strength indication into

the frequency display by making it lie dull green until a station is found, whereupon it jumps to full brightness, this happens at a very low level of 10µV. A Signal indicator LED merely mimics this action. The stereo beacon extinguishes below 100µV. Above this low level, no further indication of signal strength is provided, which is a pity. Naim could, and should, use a multi-colour LED as the Signal indicator, making it change colour at differing and higher signal thresholds. Naim-green could come up at 1mV or more, enough signal to put the 03 into full quieting, a condition where hiss sinks to a minimum and - more importantly - sound quality assumes a sort of solidity and



RECEPTION NAIM

Noel Keywood warms to its reception.

credibility that at lower signal levels is missing on tuners. Such an indication is especially useful for true audiophiles, which any Naim tuner buyer is going to be, I imagine.

Naim tuners behave themselves in use. They don't spit or let through inter-station noise. Designed to be used with a good aerial, the 03 has a higher noise muting level than many tuners, I found. Our aerial provides so much signal that noise usually breaks through when tuning conventional designs. This didn't happen with the NAT03. However, the downside is that with a poor aerial, noise muting will also eliminate weak signals, but since they will be noisy and nasty to listen to, this isn't

inappropriate, I feel.

Because the tuner's stereo channels automatically blend together below $100\mu\text{V}$, turning stereo to mono in order to lessen hiss, a mono button isn't provided. That's another facility out of the window! It also frustrates conventional sensitivity measurements. However, the full quieting threshold gives a good idea of how sensitive the tuner really is. At 1.25mV the 03 is a little less sensitive than its rivals, but not greatly so. Anyone having problems in a fringe area wouldn't be best advised to consider it, although I'd add a personal rider to this. For me, the Naims are next best to a Troughline in terms of sound quality and

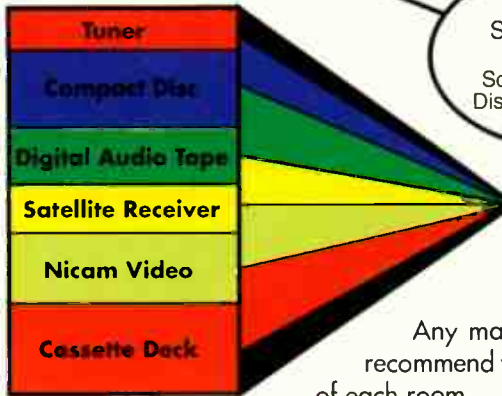
this venerable old valve tuner is horrendously insensitive. So if it's a toss up between valve and solid state, the 03 may just look to be very sensitive compared to the alternatives. However, against its immediate competition from Quad and Audiolab, the 03 loses out, being fractionally less sensitive.

What the NAT03 seems to lose to its rivals, it makes up for in sound quality. Naim have retained the peculiarly characteristic sound of the 01 and 02, which is completely free - unusually so - of that upper mid-band harshness common in VHF FM tuners. The other common drawback on VHF FM is a certain blandness of presentation and lack of stage depth. The NAT03, like its more expensive compatriots, avoids this problem too. In broad outline, it paints up a softly pure and slightly warm sound reminiscent of valves. However, it isn't as apparently lucid or revealing as a Troughline, so whilst certain comparisons are valid, I feel the 03 is very much a solid state tuner, with all the merits of high resolution frequency indication and stable, drift-free reception.

"across the midband, especially the upper midband, the NAT03 stays soft and pure reproducing speech with a lovely sense of atmosphere"

On Kiss FM, bass lines came across well, having plenty of heft. There was some grumble and a little slurring, the Troughline revealed, but I'd still rate the weighty bass of the 03 as a plus point in comparison with the anaemic sound from so many tuners; it suits Rock in particular. Trawling through the band, generally I found much the same picture. There was some rounding of high frequencies, some muting of sibilance and softening of fricatives, the extent of which surprised me. In spite of its flat measured frequency response, tiddled up with just a bit of treble lift, the NAT03 sounds a little rounded in its treble. Whilst a xylophone in the St Louis Symphony Orchestra should have rang sweet and clear, the Troughline showed, it was drawn back into the body of the orchestra where it failed to display its sprightly contribution to the St Louis Symphony March. Similarly, a tuba oomphaarh-ing away happily in the background got just a bit caught up in the general hubbub and had its presence and impact mildly compromised.

Yet across the midband, especially the upper midband, the NAT03 stays soft and pure reproducing speech with a lovely



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Many more new models to be released shortly to add to those already available from the above manufacturers plus: Alphason, SME, Audio Innovations, DNM, Chord, AVI, Micromega, Quad, Denon, Pioneer, Aura, Nakamichi, Mission, Impulse, Ruark, Castle, Rogers and many others

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sense of atmosphere; a quality so often missing from modern tuners. This is a deeply relaxing tuner to sit in front of. Its weaknesses would be difficult to detect without a reference, they are so benign.

For me, the NAT03 offers the best of valve and solid-state worlds. Confined strictly to one camp or the other, it doesn't match up, having neither the sound quality of a simple valve tuner, nor the facilities of a solid state design. What it does have is a convincingly natural and unusually relaxing sound that is unique and distinctive, setting it apart from rivals. It also has solid, weighty bass. With these fine qualities in mind, it is a tuner that should be auditioned; many listeners will be rapidly convinced it is for them ●

NAIM NAT03 - £499
Naim Audio Ltd.
Southampton Road,
Salisbury, England. SP1 2LN.
Tel: 0722 332266



MEASURED PERFORMANCE

Naim long ago invested in the expensive and dedicated RF test gear needed to get a tuner right. To some extent they set a standard here that others have since been obliged to meet. The NAT01 and 02 measured well as a result - and so does the new NAT03 tested here. Its frequency response measured flat, with just a trace of high frequency lift, as our analysis shows. This is just enough to ensure a good sense of clarity will be conveyed, whilst maintaining basic tonal balance.

The only peculiarity our analysis doesn't show is a subsonic bass peak in the mono channel of +5dB, down at 6Hz. On a powerful solid-state system with deep bass extension (bass extension in speakers can be gained at the expense of efficiency, demanding more power) this sort of peak can be heard to usefully increase the feeling of bottom end weight, or 'heft'. Other notable products with a subtly audible bass peak are Nakamichi's top cassette decks and the now obsolete Cambridge CD-1 CD player.

Channel separation on stereo measured no less than 50dB at full modulation (maximum volume), but hovered around 45dB - our quoted figure - at 80% modulation, the measurement level. This high level of separation was well maintained right up to high frequencies (36dB at 10kHz), pilot tone phase being accurately set.

Similarly distortion was low, measuring 0.13% (average of mono and stereo channels) at 50% modulation. The little extra distortion that did exist over some tuners was merely innocuous second harmonic in the mono channel. Furthermore, tune accuracy affects distortion, but only a little. When measuring in a situation like this I average a number of readings from tuning in normally, so our result isn't an unrepresentative best case figure. The NAT03 truly is a low distortion tuner, right up with the best.

The sudden dive down in the frequency response trace at right is caused by a pilot tone filter at 19kHz. It pushed the pilot down

to -62dB and subcarrier (at 38kHz) down to -42dB, satisfactorily low values.

It is possible these days to get hiss down to -78dB or so in tuners, but I use -70dB as a threshold of audibility and acceptability. A majority of tuners hover around the -72dB mark, including the NAT03. It managed -71dB hiss level, providing it receives a good, strong, aerial signal of 1.25mV or more. These days, half as much isn't an uncommon figure for 'full quieting' to be achieved, so the 03 isn't especially sensitive. It must be used with a good aerial, but then for good sound quality, so should all tuners, irrespective of their sensitivity.

I could not measure sensitivity conventionally, because the NAT03 channel blends stereo transmissions automatically at 100µV to keep hiss down to an acceptable level. In a similar vein, it also mutes all signals below 4µV, so very weak and noisy stations are completely unobtainable. If a station normally receivable on other tuners is cut out by the 03, then a bigger aerial with more gain must be used.

Selectivity of the review sample was unbalanced, stations of higher frequency (+0.4MHz) breaking through more easily than those equally spaced, but at a lower frequency (-0.4MHz). However, the actual figures of 80dB,

which is very high selectivity, and 64dB, which is low-ish, but acceptable and not uncommon for real hi-fidelity (a Leak Troughline manages around 60dB and low selectivity undoubtedly plays some part in its fine sound quality, since there is trade off between these parameters). The average result is 72dB, which is respectable.

Finally, output measured 300mV, which isn't much and precludes the use of passive pre-amps, except where a very sensitive power amplifier, like our own K5881 for example, is being used.

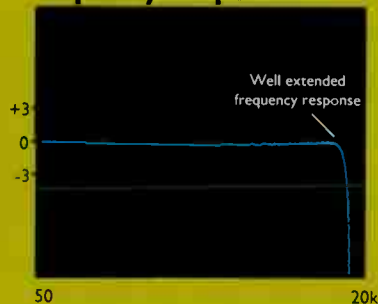
Peculiar it may seem ergonomically, but in the new NAT03, Naim have simply continued their tradition of determined minimalism, combined with excellent performance; this is a well engineered tuner.

NK

TEST RESULTS

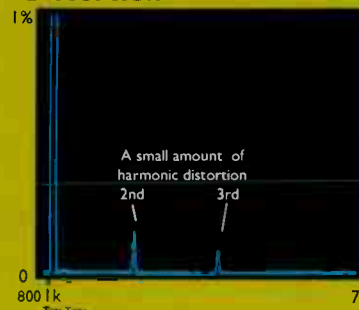
Frequency response	12Hz-14kHz
Stereo separation	45dB
Distortion (50% mod.)	0.13%
Hiss (CCIR)	-71dB
Signal for minimum hiss	1.25mV
Selectivity (at 0.4MHz)	72dB
Sensitivity	See text
Signal strength meter	none

Frequency Response



The NAT 03 has a flat and well extended frequency response.

Distortion



The Naim has a small amount of low order distortion.



Digital Domain

Dave Berriman assesses Philips' DSS930

Digital Active Loudspeakers and DSC950 Digital System Controller.

Philips' DSS930 digital active loudspeakers offer the next logical step up from the analogue active loudspeaker. It's not a completely digital loudspeaker of course - the woofers and tweeter are analogue and so are the power amplifiers, but downline, in front of these analogue parts, some serious digital signal processing is used.

Perhaps the greatest problem with conventional loudspeakers is the crossover network. Active loudspeakers, in which the filtering is carried out prior to the power amplifiers, allowing them to couple directly to the speaker drive units, offer a solution, albeit a complex one; Philips use their skills in high technology to advance the active loudspeaker into a form that few can match.

The DSS930 loudspeakers, which are mains powered, have to be used with a

DSC950 Digital System Controller if all the wonders of digital processing are to be gained. They can be used alone, but performance suffers. The controller contains much of the digital circuitry, accepting both digital and analogue inputs. The latter are Bitstream converted to digital for subsequent processing within this unit.

After all the digital data has been fully processed, it is transmitted - still in digital form - to the loudspeakers, down just one digital lead to each. In each speaker, it is turned back to analogue by a DAC (Digital to Analogue Converter) before being passed through the amplifiers to the drive units.

The DSC950 has been designed for multi-room applications in which up to twelve loudspeakers in three systems can be daisy-chained using just one phono-

type coaxial lead. This carries both channels and all control data around the system. Speaker switching, volume, balance, and input selection etc, are all controllable from the front panel or via an infrared handset.

The user-chosen role (position) of each loudspeaker must be conveyed by setting a small switch at the speaker's rear to Left or Right. Within each cabinet are two 5 1/4 inch polypropylene-coned woofers and one electro-dynamic foil type Isophase tweeter, all made by Philips. The two woofers, purpose designed for the DSS930s, are driven by an 80watt high power amplifier (320 watts on peaks), while the tweeter has its own 20 watt amp (40 watt peaks).

The tweeter has two bitstream DACs to itself, wired in balanced mode for reduced noise and distortion, both

woofers share one pair of DACs. The woofer nearest the floor is rolled off before the upper one at 650Hz, allowing both to operate at low frequencies, while only the top one radiates in the midband. I can only assume the lower of the two is connected to the woofer power amplifier via a passive analogue filter (Philips do not mention this in the various brochures, but this is the only way the one amplifier can supply both woofers in this fashion).

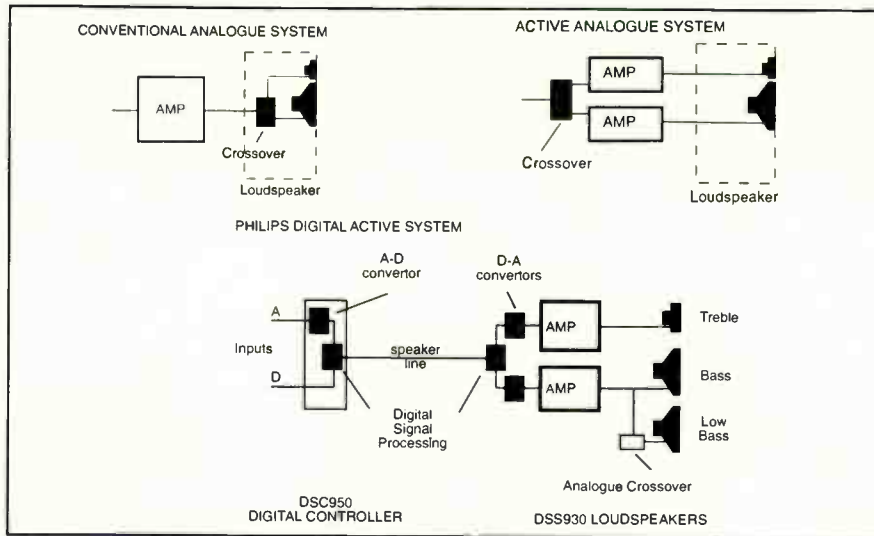
In addition to the digital filtering used to split frequencies to the drive units, replacing the crossover, the DSC950 digital systems controller also provides a switchable compensated mode which effectively does several things in the digital domain. Firstly, compensation corrects for some unwanted frequency-response trends in the woofer (a rising response and a peak, claim Philips).

Secondly, it extends bass below the woofer's resonance frequency using a digital filter algorithm with a dynamically-changing response. This boosts the area below resonance, extending the response to around 40Hz. To protect the woofer from being overdriven, and to allow for the ear's natural increase in sensitivity to bass, the boost is progressively reduced as volume level increases.

Thirdly, with compensation switched on, it linearises the phase response of the system.

Though I have left it until last, and Philips don't really explain it in the brochure, the fourth function is probably the most significant: to correct for the loudspeaker's response in the time

eliminated by filtering in the frequency domain. With time-domain correction, reflections or resonances (once they have been captured using digital sampling techniques), can be removed by Finite Impulse Response filters having the exact inverse response. Interestingly, accurate time domain compensation automatically corrects the frequency-response aberrations.



In the Philips system, the crossover filtering and compensation are actually performed by the same FIR filters, having a slope of -36dB per octave. Philips claim that the filter characteristics take into account many measurements taken over a half-sphere at 1 metre in front of the loudspeaker, rather than just a single point, making them more meaningful.

Because the signal is filtered and processed in digital form, a conventional volume control is of no use (likewise, a conventional analogue filter will not work in the digital domain). Digital volume controls are essential. Here, each digital 'word', representing the amplitude of the analogue signal at any instant, is recalculated at enormous speed while you

expect?). I first fired the system up using the analogue CD input and compensation. Playing a few favourite CDs I rapidly became aware of the neutrality and naturalness of the sound. It had that hear-through quality that reminded me of electrostatic loudspeakers; there was virtually no hint of edge or aggression. I found that the isophase tweeter was very revealing, yet also easy on the ear.

The whole sound seemed remarkably well integrated, regardless of what I threw at the system. The raunchy vocals and driving rhythms of Chrissie Hynde, the primeval rhythms of Stravinski's Rite of Spring and the sensual sax of John Coltrane were handled evenly. Vocals were excellent, rhythms crisp and driving, string tone clear yet clean and timpani

had that crisp whack in which the harmonics and fundamentals seem to arrive at the same time. It's a system that, in motoring parlance cruises like a Rolls and corners like a Mini.

Weak areas? Well there are bound to be a few in any system. To my ears the bass seemed to be struggling to sound well. Sometimes there was no hint of a problem, at other times it seemed slightly soft and lacking in punch deep down. Ironically, bass sounded best when playing loud - presumably because the electronic boost is then minimised. If the low bass boost was removed by switching off the compensation (the only way it can be switched off), the bass became shallow and lacking in depth.

This brings me to my other quibble, which is about the switchable compensation. With it switched in, the bass and treble controls do not function - they are, in effect, set to flat. With it switched out the bass and treble are adjustable, but the system sounds so much better with compensation I cannot imagine anyone wishing to listen without it. Besides deepening the bass, compensation also improves the sense of depth and transparency. It is so much more natural as to sound like two different systems - one very ordinary and the other excellent. There really is no comparison.

Remember, these contrasts occurred with the same drive units and amplifiers. The digital filters are the only parts that produce any change, and then simply by using a different algorithm for computations. According to Philips, it

"Secondly, it extends bass below the woofer's resonance frequency using a digital filter algorithm with a dynamically-changing response."

domain. To fully understand the significance and advantage of time domain over frequency domain compensation would take another article. But the kernel of it is this. Normal filters, like tone controls and graphic equalisers can only correct for errors in steady-state output by boosting or cutting various frequencies, or ranges of frequencies. The imperfections can be due to resonances and reflections in drivers and cabinet panels and there is no way these can be

are listening. The FIR filters work in essentially the same way. The resulting new strings of 'words' represent either a reduced overall volume level or, after the filters, modified frequency phase responses.

SOUND QUALITY

I must admit to being somewhat sceptical about this all-digital system (after the 'perfect sound forever' farce, what do you

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takes eight hours to re-calculate the FIR filter algorithms using a Hewlett Packard Mainframe computer, but once programed such filters perform their feats with remarkable speed. I suspect the compensation on/off switch is there simply to demonstrate how effective this digital filtering system is.

Further listening was carried out using the CD player's digital output direct to the DSC950's digital CD input. This sounded significantly more transparent than the pre-amp alone with equalisation switched out, with more musical strands revealed. No doubt this was due to the removal of the CD player's Bitstream DAC and Philip's ADC in the DSC950. Two lots of distortion and filtering were eliminated in one go. Treble was crisper and the sound less 'rounded'. Overall this mode proved more satisfying, but showed a hint of treble

brittleness, which I suspect may be amenable to changes in CD transport (a medium - cost Philips derivative was used for testing and this had the advantage of responding to the DSC950's handset for complete control over player and system).

Taken overall, the Philips controller/loudspeaker combination offers a very different sound to most passive loudspeaker systems. Sheer weight of technology has enabled Philips to achieve results that would have been difficult by any other means, but on the down side, there's not much scope for dabbling with the sound. What you see (and hear) is what you get.

Apart from my tone control gripe and a slight question mark over the deep bass which, it must be said, goes down deeper than you'd expect from this size box, the design must be judged a success. The sound may simply be too neutral for some; in the fully digital mode these speakers can be just a trifle dry and clinical.

However, at £1,300 for both speakers and stands, plus £400 for the controller, here's a complete digital system (apart from the source) with an excellent sound at a very reasonable price. On top of that, there's the potential for multi-room use ●

MEASURED PERFORMANCE

Perhaps the greatest problem with conventional loudspeakers is the crossover network. In classical design theory it's just a filter, inserted between the power amplifier and each drive unit, removing unwanted frequencies and at the same time blending acoustical outputs in the desired way to produce a uniform frequency response. At first glance this looks pretty simple - but life is not so easy.

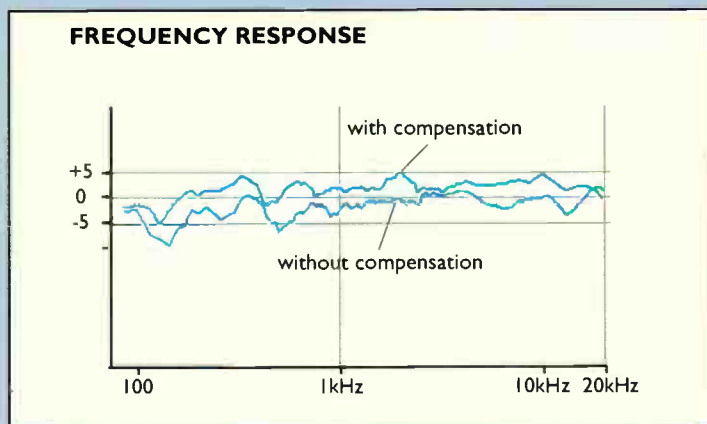
There's not only amplitude to consider, but phase, both of which are affected by filters: the overall response of the speaker system is seldom linear in both amplitude and phase. I'm sure there are pundits who would argue for hours about the relevance or otherwise of accurate phase response in loudspeakers, but if amplifiers had the phase

and group delay characteristics of many highly regarded loudspeakers, there would be an outcry!

The simplest filters are phase accurate, but are not sharp acting enough for all but the best drivers (and then off-axis performance can be variable). Complex filters can be more accurate in phase and amplitude, but the extra components add their own distortions and colourations, which are all the worse due to high currents which must be handled. For instance, woofer inductors can have high d.c. resistance and if wound on a magnetic core can introduce distortion and saturation effects. The more coils there are in the woofer network, the greater the potential for deterioration in sound quality.

One way round many of these problems is

the active analogue loudspeaker, in which the crossover is carried out at a low voltage and current level prior to the power amplifiers, (using one amplifier per drive unit). This enables the power amplifiers to couple directly to the speaker drive units, keeping them under better control. Active loudspeakers can contain much more complex electronic crossovers in which unwanted frequency-response and phase trends in the drivers (or due to driver positioning) can also be compensated more elegantly than by using only passive components, and without introducing other problems. With the advent of digital audio it has become possible to take this one stage further with processing in the digital domain using digital filters. **DB**



BETTING ON

Eric Braithwaite finds a winner in Michell Engineering's new Alecto Stereo power amplifier.

one cheaper package. This only child of two parents is definitely genetically related, but its sound is sufficiently different to make it an alternative choice, not a cheaper clone.

Talking to Tom Evans elicited a couple

it rapidly. And warmed is the word. The whole presentation has a golden aura about it that meant it was barely switched off except when other amplifiers had to take its place, and then usually with demands that it should be brought out of the stable as soon as possible and given another gallop over the field.

Over the couple of months I've had it, it never disappointed me again. I'm not going to list long tracts of the records (and CDs, if we're going to be pedantic) that

flowed through it, but it ran through The Cure, Chopin, Pink Floyd and Panufnik, Art Blakey and Beethoven day after day without failing a single fence. Mostly, this was with ESL-63s,

but Harbeth's splendid little HL-P3s were pressed into service too. It made even Jean-Michel Jarre's

Chronologie

and the weird

Waterboy's Dream

Harder, both winners of the

Oberstein prize for seriously over-priced rubbish this year, listenable all the way through - once! With the Lemon Trees' Open Book, it didn't disguise the fact that some of the bands' harmonies are close to pastiche, but it certainly made each subsequent playing sound as fresh as the first. This is not an amplifier that squeezes the music dry the first time: it makes you want to come back to it and enjoy it again . . . and again.

Here are just three examples from the weeks of listening to give a flavour of the Stereo. Ruggiero Ricci's recording of the Tchaikovsky Violin Concerto on an early Decca SXL had a visitor leaning forward in excitement and awe. And later, animatedly discussing his astounding technique and the beautiful tone of the violin. We thought he had a Guarnerius - that he does was confirmed by his Paganiniana on the Walter Lily label.

Michell Engineering's new Alecto Stereo power amplifier is almost indistinguishable from the wonderful Mono. It has the same dark smoked acrylic base and the same huge black transformer case, as large as a hat at Ascot. It also shares the same upright black heatsink, which never becomes more than lukewarm, but now the four loudspeaker terminals deliver to left and right speakers instead of one pair being for bi-wiring, as they were in the monoblocks. Bi-wiring is possible - I used it with a pair of Harbeths - thanks to the terminals being Michell gold-plated binding posts. You have to use plugs for one set of cables, and bare wire for the other.

The Alecto Stereo has a mite less power than the monoblock version, delivering 80w or thereabouts per channel, I was told (see Measured Performance for actual values) instead of 130w and it's cheaper by £500. In case readers still have sour memories of the Aintree shambles, I'll lay off the racetrack metaphors any minute, but Michell and Tom Evans the designer have decided on a 'horses for courses' approach.

Readers who have already forked out for the paired Alectos need not fear their choice has been supplanted by a rebuild that's squeezed the sound of the two into

of points. One, by-the-by, was that his familiarity with the more obscure names of the Furies was more to do with having Greek ancestry than with scouring a Larousse encyclopedia of mythology at bedtime.

More important, however, is his explanation of the Alecto Stereo's ancestry. Friends who heard the Alecto monoblocks when they were in residence remarked on their valve-like smoothness and engrossing tonal colour. For followers of form, its designer reckons the stereo version is an Alecto monoblock with some of the best parts of the sound quality of Leak amplifiers of yore.

I'd say he'd succeeded. I was a little disappointed at first, because after the monoblocks had delighted me with some thunderous bass, the stereo seemed comparatively unadventurous at plumbing the real depths of Hades. But I warmed to



THE STEREO

That's insight, for you, and I'm talking about the amp, not the listeners.

The Alecto became something of a reference point for cleanly delineated detail: the percussionist in Dave Grusin's 'Mountain Man' strikes two edges of a triangle out at the back somewhere. With most amps you hear a triangle. With the Stereo Alecto you clearly hear the two notes.

Another exemplar of amazing technique is a guy called Catfish Keith I've just discovered, who plays bottleneck country blues on a National Steel like you wouldn't believe. The CD (on Fishtail Records, available through HotShot Distribution) wasn't quite the quality of his live performance at the Mean Fiddler, but it was pretty damn close. There's just a touch of blowsiness about the Stereo Alecto which suits the blues.

Third, a different kettle of fish again. This time, the amazing percussion of Art Blakey and the Afro Drum Ensemble.

Tom-toms, talking drums, kettle drums: there they all were, tangibly arrayed in front of us and every drum recognisable. No, maybe the bass wasn't as powerful as on the Monoblocks; but it had a bloom about it that said "Leak", without doing more than softening the attack a fraction.

If there's more 'valveyness' in the Stereo than the Monoblock it's in the perception of the soundstage. The stereo version has the breadth and size of individual players and instruments, the display of full tonal colour of its parents, but not the walk-around three-dimensionality that made them so extraordinary. Yet the overall scope is nearly as broad: even more musically involving, because the stereo version is a touch more forgiving. It's not quite as ruthless and it's smoothed a little in dynamics, with a little less of the power punch that had me sometimes fearing for the safety of speaker cones (or diaphragms)

with the monoblocks behind them.

It's reviewer's cant, but when the Alecto went off to be measured, I really did miss it. It has the knack of allowing you to believe you are listening to a live event and ignoring the fact that it's coming from an artificial medium. Good ancillaries help, as always, in this case including the Sugden SDD-1/SDA-1 transport and DAC combination at about the same price. Externally, this pair might not be as beautiful as Helen of Troy, but the sound coming through an Argo and the new Alecto would have certainly cheered up King Priam no end.

That, really, is what the new Alecto is all about. If you want sonic happiness, to concentrate on the sheer quality of the music, to sink pleausurably into it, no matter whether it's Creedence Clearwater Revival or Rachmaninov, the Greeks have a new word for it. It's Alecto - Stereo ●

MEASURED PERFORMANCE

"It's meant to give the flavour of the monoblock at a good price to enthusiasts". That's an important observation about this new stereo amplifier. It was made by Tom Evans, the designer, when I spoke to him about a problem revealed by measurement. For the new Stereo was reluctant to deliver full output into a four ohm load, a problem I have encountered before with the Aura VA-100 amplifier. The reason is straightforward enough: the Stereo uses one pair of Hitachi power MOSFETs which alone are unable to deliver enough current to supply a low load without going into thermal limiting.

Tim de Paravicini, who designed for Lux in Japan, told me that the Japanese never attempt to use this device in single pairs. He also said the test most commonly used to emulate real-life operating conditions to assess the likely impact of such a phenomenon is to put high level noise (pink noise) through the amplifier whilst it is feeding a low load. I did this and found that the Stereo was limiting. This confirms that in use, if driven hard it will limit with low impedance loudspeakers (i.e. ones with a nominal impedance of 6ohms or less).

In Britain, 99% of speaker manufacturers use 8ohms as a minimum value, meaning that overall impedance is in fact commonly 10-

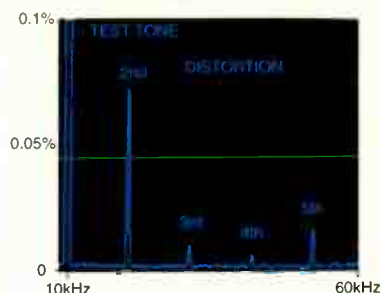
12ohms. For this sort of speaker, the Stereo is unusually well suited, since it swings lots of volts (28V), acting as the equivalent of a 100watt amplifier. This means it drives high impedance loudspeakers very well. The only reservation I have is that KEF and now B&W are now lowering impedance to increase the quoted voltage sensitivity of their speakers, as well amplifier output utilisation. These speakers are to be avoided with an amplifier like the Alecto Stereo.

In all other areas, the amplifier measured well. It has very wide bandwidth, low distortion right across the audio band and very low noise. An input sensitivity of 600mV means that passive pre-amps won't match, except with CD players. The servo circuits kept d.c. output offset to a very low level.

The Alecto Stereo has one pair of output devices compared to the Mono's two. It thermally limits into loads of 4ohms or less, which means it matches 8ohm loudspeakers only. This apart, it measures very well. **NK**

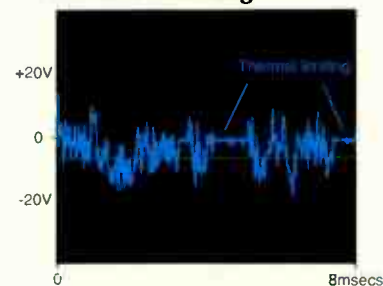
Power	98watts
Frequency response	4Hz-77kHz
Separation	60dB
Noise	-118dB
Distortion	0.02%
Sensitivity	600mV
dc offset	-0.6/-0.3mV

Distortion



Extended distortion harmonics were produced by the Alecto stereo; this is typical of low feedback MOSFET amps.

Thermal Limiting



Into a low load the single pair of output MOSFETs thermally shut down for very short periods of a few milliseconds.

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Continued on page 17...

HORNS AND TRANSMISSION LINES

I have been trying, since reading your article, to get, buy, or borrow a copy of "The Loudspeaker Design Cookbook", as well as locate 'in depth' material / publications on designing (not copying) folded horn and long path enclosures i.e. including maths formulas, laws and principles necessary to calculate (and governing) horn shape and driver rear wave path etc. Also how to choose suitable drivers for these types of enclosure (under what "threshold" value of Qts, and what other parameters are critical?).

These things do not seem to be so critical in transmission line enclosures, as I recently quickly "patched" together a pair of 8ft lines using budget priced Blaupunkt full range car stereo speakers; the sound was clean and the bass natural.

I have tried libraries, book shops and electronics stores for this kind of information, but to no avail.

Can you recommend any titles or sources (Babani series doesn't go this far and other publications only seem to provide for DIY design copying).

The LEAP program your magazine reviewed looked promising (if expensive) until I read that it only deals with "strait-jacket" and "woof-woof" cabinets.

As I'm only interested in horn and long path and transmission line speakers (e.g. TDL) this program would be of no use to me.

Any help you can offer in my quest for musical truth would be exponentially and hyperbolically appreciated.

**M. Kennedy
Belfast**

Your request is for 'in depth' material on horns, so the following publications are rather mathematical in their approach, and assume a good familiarity with electrical circuit theory and electrical analogues of mechanical and acoustical systems.

I can recommend 'Design Factors in Horn-Type Speakers' by Daniel J. Plach, (Journal of the Audio Engineering Society, October 1953) as a starting point, as it covers low frequency horn design in good detail, but

the analysis assumes 'perfect' horn behaviour, which is seldom the case with practical designs where the mouth and length are smaller than ideal. The particular problems of high frequency horns and drivers are not covered. This paper is reprinted in the AES Loudspeakers Vol. anthology, available from the AES, P.O. Box 645, Burnham, Slough, SL1 8BJ.

Another paper which should be easy to obtain is 'Horn Loudspeaker Design' by J. Dinsdale (Wireless World, March, May and June 1974). The analysis presented is not as

frequency drivers, I would suggest looking for 12" or 15" units with a low resonant frequency, high dynamic mass and a BL factor of 20 N/A or higher, as I stated in my letter in August's edition. High frequency drivers should be of the compression type for best results.

In order to 'tune' a horn system of your own design, the facility to measure the electrical impedance of the unit versus frequency would be very useful, as would the facility to measure the frequency response. Equipment to perform these measurements is now available

least the popular ones, tend to operate on a hybrid of principles. At upper bass frequencies the chamber behind the bass units behaves as an infinite baffle, but as frequency falls the 'line' comes into play, initially acting as a tuned pipe and ultimately as a subsonic, non-resistive, reflex enclosure.

Art has been defined as a science with many variables. Obtaining a smooth transition between these stages is thus a matter of making artistic compromises. Since there can be no such thing as a perfect compromise - if it were perfect it would not be a compromise -

it is clearly difficult to envisage a definitive guide to transmission line design. However, Mr Kennedy is correct in noting that it is fairly simple to obtain pleasing results, even upon a 'cut and try' basis. However, developing those designs to optimum requires a full understanding of loudspeaker drive unit behaviour and conventional systems design, since transmission line speakers are further complicated by the co-operation of these various operating principles.

John Wright,
TDL Loudspeakers



The Tannoy Westminsters, would you like to build something like these?

technical as Plach's, and the practical designs given in the third part are open to criticism on several counts.

The book 'Elements of Acoustical Engineering' by Dr. H. F. Olson (2nd. Edition, 1947) contains a rigorous mathematical analysis of horns, together with graphs of throat impedance and radiation patterns for real horns, and copious references. This work is indispensable for the professional engineer, as is 'Acoustics' by Leo L. Beranek, which covers much of the same material. Both books should be available in libraries, and I believe Beranek has been reprinted in paperback.

The June 1993 edition of the Journal of the Audio Engineering Society is totally devoted to horn theory, but the papers are very mathematical indeed, covering the latest developments in finite element and boundary-element analysis of acoustic waveguides.

As to the choice of low

for less than the cost of a pair of commercial middle-range loudspeakers, and would be a good investment if you are serious about designing your own loudspeakers.

**Martin Lawrence,
Freelance Loudspeaker
Consultant.**

Whilst over the years there have been many DIY and kit transmission line speakers, it is difficult to find an authoritative work on the subject. I believe this to be because of a basic misunderstanding of the principle as applied to actual loudspeaker systems. If such a speaker were truly a transmission line, then the energy from the rear of the cone would be totally absorbed, resulting in a falling bass response. In practice, low frequencies are enhanced by the output from the port.

Commercially available transmission line speakers, or at

The Loudspeaker Design Cookbook, by Vance Dickason, has a chapter on transmission line loudspeakers, albeit a short one. It is available from Wilmslow Audio and IPL. You really need to get reprints of articles by Professor Bailey, published in Wireless World sometime back in the Sixties, when he and Arthur Radford worked on the principle, reputedly using an electric train to carry a measuring microphone along the line, to make measurements.

There is very little published info available in the UK on horns or transmission lines. U.S. articles can be found in the British Library, Science Reference Section. You can 'phone the Library direct on 071-323-7494/6. They are currently at 25 Southampton Buildings, Chancery Lane, Holborn, London. Opening times are Mon-Fri, 9.30am-9pm, Sat 10am-1pm. NK



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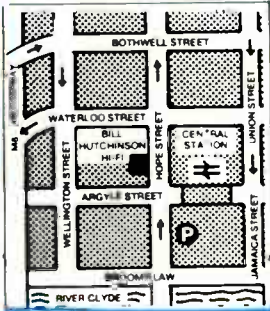
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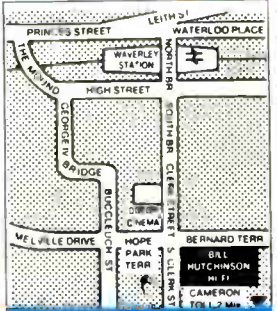
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SUMMER SOUNDS

personal stereo group test

Dominic Todd takes to the beach at Scarborough with a brace of personal stereos. Here are his conclusions.

As the British Summer makes a brief appearance (rise more), thoughts turn to holidays in the sun and all the paraphernalia which goes with the beach, one important item being the personal stereo. Here we take a seasonal look at what's new.

Despite CD's recent dominance in the

separates market, it's the humble cassette that still rules in the portable music domain. There's no shortage of new models at a wide variety of prices.

The models here range from £22.99 to £149.95 and fall into two main groups, budget (around £35) and quality (around £130). It would appear that your extra £100 buys you compactness, rechargeable batteries, remote control, a smart carrying case and a good deal of street cred, but does the extra cash result in better sound quality?

Candidates come from six of the big high street names. In this case the budget models came from Sharp, Philips and JVC in the form of the JC-212, AQ6426 and the CX-8 respectively. Representing the quality field are Sony, Aiwa and Panasonic with the WM EX606, PX 727 and the RQ-570 respectively.

The music used for testing purposes was as follows: The pre-recorded version of Dire Straits

'Money for Nothing', possibly the most played cassette whilst on the move! A home recording of Cabercaillie Delhume, representing female vocalists. A high quality recording of Frank Zappa using a Nakamichi Cassette Deck 1, Jazz at the Pawnshop* recorded from vinyl using Dolby B to test the machines' Dolby circuits, and finally a recording of a Chopin piano recital to clearly reveal speed instability.

I used all the personal stereos with my own pair of Sennheiser HD-450s, as well as those headphones supplied with the machines. This gives an opportunity for the personals to show their best and not to be constricted by their supplied 'phones.

All the players had some form of bass extension boost control which seems to be an obsession amongst personal stereo manufacturers at the moment - whether or not it's what the public want is a different matter.

What struck me with the more expensive players was the sexy and sophisticated packaging. All seemed like latter-day Art Deco cassette cases, shedding the hard plastic skins of their cheaper counterparts for slim metal jackets. A lot of thought has also gone into the ergonomics of the more expensive players, one of the bonuses being the "feel-good factor" of slick controls. This is just as well, as materially you otherwise don't get a lot extra for your money I found.



SHARP JC-212 £22.99



The main function buttons are logically laid out and the majority are stiff enough for them not to be accidentally activated. The volume control is easily accessible and operates smoothly. My only gripe is that the direction switch could occasionally be unintentionally activated in a crowded bag.

The player was plunged straight in at the deep end with

Chopin's piano concerto, and turned in a very respectable performance considering its price. There was some pitch instability, but not as bad as one might expect for a machine costing only £23. However, the sound itself was compressed and the piano sounded slightly distant and muffled.

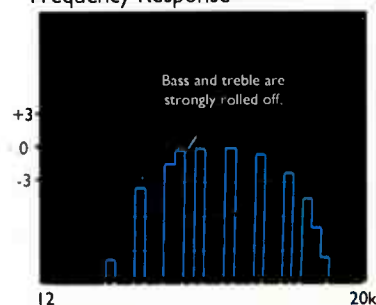
Dire Straits quickly showed that the graphic equaliser grossly distorted the sound - this is best used with care! There was also a slight lack of bass, even with the "X-bass" switched in - no bad thing

with some types of music where a heavy thumping bass is unwanted, but as most pre-recordeds are bass light...

Frank Zappa had a spacious air on 'Yellow Snow', but still a constrained mid-range and a dull top end. Jazz at the Pawnshop lacked vibrancy and many of the subtleties of the recording were missed. The Sennheisers improved things considerably, yet the sound still lacked a little life and was coloured.

All in all, The Sharp made a fine effort, one which was easier to listen to than I'd imagined. Mediocre speed stability did not compromise piano music too much and the basic machine proved worthy of upgraded headphones. This is a good, cheap hack machine for the beach.

Frequency Response



The Sharp lacks deep bass and extended treble.

The Sharp is typical of its breed. It is large and has a cheap matt-finish plastic case, features that are obligatory in this price range. Others include a 3-band graphic equaliser with "X-bass", auto reverse, a belt clip and a pair of banded headphones. All that is really missing is Dolby B. These features are vital at this price level if it is to sell well against competition, more so than its sound quality.

Control-wise, I have few complaints.

PHILIPS AQ 6426 £34.99

The Philips is slightly smaller than the Sharp and feels more expensive. It has a smart Nextel finish which makes the Philips more practical, as it is less likely to show the inevitable marks that appear through use. Features include auto reverse, Dolby B, Dynamic Bass Boost (DBB - I assume!), a belt clip, banded headphones and, surprisingly enough for a personal of this price, an eject (Open> button rather than space for a thumb lift.

The main controls are a little cramped, but still acceptable. Unfortunately the 'Open' button isn't terribly well placed and could be activated unintentionally, which might result in chewed tapes. Other than that, the controls shouldn't operate without assistance.

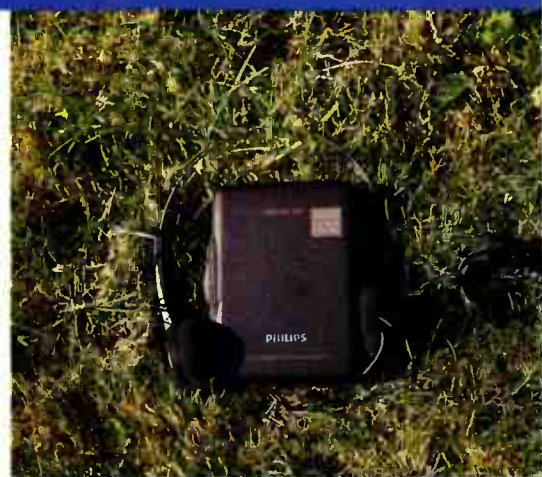
Dire Straits sounded very tinny, but with DBB switched on a fuller sound was produced, yet it still lacked proper bass. The sound was brighter than the Sharp, but the treble was grainy and harsh, especially at high volumes. I certainly couldn't accuse the Philips of masking the sound of Jazz at the Pawnshop, it gave plenty of detail and vibrance - too much in fact. Brass became trying to listen to and this was with the Dolby circuit switched on, but on the quieter sections motor noise came through. Whilst listening to this track a quick flip to side B showed the player has very fast auto

reversing.

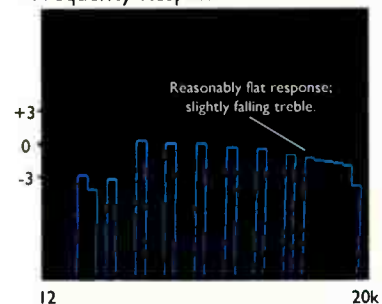
Chopin's piano concerto showed that stability was acceptable at the price, however it did seem to run a little fast. Frank Zappa wasn't quite as spacious as he was on the Sharp and the bass did tend to drag its feet. Female vocalists suffered the most at the hands of the Philips, the mid-top showing cuppiness and a nasality which severely coloured the music.

Once more, the Sennheiser headphones offered greater insight to the music. There was a more natural top and mid range sound, replacing the rawness of the Philips headphones. However, the sound was still congested and confused in places.

All in all, I found a rather uneven performance, one which could sound exciting, but also a little trying after prolonged listening. The motor noise also let the side down a little, which is a shame as the Dolby circuit worked well without too much smearing, and all the controls worked quickly and smoothly. The Philips is by no means a poor personal, but it seems to offer little over the Sharp, which is £12 less expensive.



Frequency Response



The Philips has a very flat response at the price.

JVC CX-8 £39.99

The JVC is close to the Sharp in both size and feel; in other words it appears a little bulky and cheap. Nevertheless, the player is well featured, with auto reverse, Dolby B, 4-band graphic equalizer including "Hyper Bass", twin headphone sockets, metal tape capability, belt clip and banded 'phones. Ergonomically it's like the Sharp too, with few problems, bar the direction switch.

Sonically, the JVC sounded closer to the Sharp than the Philips. What bass there was, was just lower-mid, even with the 'Hyper Bass' turned right up, although 'once again this could be a blessing in disguise to some. The graphic equalizer was also clumsy in operation, just as the Sharp had been.

The Chopin tape turned out to be a pleasant surprise. Light bass suited classical music and the pitch stability seemed very good for the price, yet like the Philips this player did run noticeably fast. Unfortunately, Jazz at the Pawnshop didn't fare at all well. The sound was smeared and less detailed than even the Sharp, probably due to the poor implementation of the Dolby chip. Using a hi-fi quality recording without Dolby,

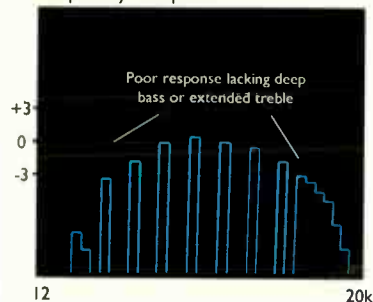
the JVC really sang, especially with a pair of upgraded headphones, although the standard ones aren't too bad. The mid-range of both Frank Zappa and Capercaille appeared more natural than either of the other two players in its price bracket.

The sound quality of the JVC was a mixed bag, but provided Dolby isn't used it will give a sterling performance with most tapes. A lack of bass will lend itself to some types of music, but bass lovers should look elsewhere. The above-average sonic ability easily outweighs what is a rather bland and bulky appearance. At under £40, JVC's CX-8 is a step up from the Philips and Sharp in value and sound quality terms.



personal stereo group test

Frequency Response



Wider response than the Sharp, but no match for the Philips.

AIWA PX 727 £129.99



also a rechargeable "chewing gum stick" battery and ten minute quick charger (accounting for the weight of the box). An embossed case, AA battery adapter, spare pads and in-ear 'phones with a remote on the cord, which indicates battery condition are also included.

I found no problems ergonomically, which is quite surprising when you consider the number of functions. However, the

battery cover is hopelessly flimsy and doesn't look like it would last long. The first thing which I noticed about the sound of the Aiwa was that it was far more up-front and brighter than the other three players, even with the '450s. Unlike the Philips, though, the Aiwa didn't offer clarity at the expense of grittiness and grain.

All tapes sounded smooth and relatively un-fatiguing, despite some tinniness with the Aiwa's own 'phones. It had no problem with Dolby recorded tapes either. Jazz at the Pawnshop showed up the natural rasp of the saxophone; this was the first machine to

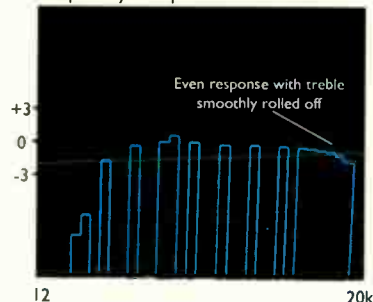
really do the recording justice.

One thing money can't buy it seems is pitch stability and speed accuracy. Whilst the Wow and Flutter was by no means intrusive it was still noticeable on sustained piano notes.

Generally though, the Aiwa sounded like a superior machine and its well balanced, smooth sound was retained throughout the test. What's more, the headphones did nothing to detract from the main unit's performance (bar the inevitable lack of bass with in-ear 'phones). Despite dubious graphics and slightly flimsy fixtures, the Aiwa is a good all rounder.



Frequency Response



Light bass, but even response with smooth treble.

The Aiwa came packaged in a large, heavy box of goodies; the player itself is only fractionally bigger than a cassette case! The metal casing is finished in matt black with silver legends and blue and pink panels which look a little incongruous on such a machine.

When you pay £130 for a personal stereo you expect a lot of features. The Aiwa doesn't disappoint: Auto-reverse, Dolby B, logic (i.e. not mechanical) controls with a hold (lock) function and a "multi sound processor" as Aiwa put it - basically a pre-set graphic equalizer with 'flat', pop, rock and jazz settings. There is

SONY WM-EX606 129.99



is very unusual for a Walkman, but quite useful for skipping through unwanted tracks. Once more a smart touch - rechargeable battery and charger and remote in-ear 'phones are all included.

Listening to the Sony highlighted a small operational problem. The volume control became obstructed by the headphone lead making it difficult to change the volume setting.

This player's sound quality was free from any serious gremlins. I felt that of all the personal stereos, it portrayed Chopin in the most natural and listenable way. Despite running a little fast, it was a stable player and displayed a fine level of spaciousness and detail, without suffering edgy treble or bloated bass (provided that the "megabass" is left in its mid setting).

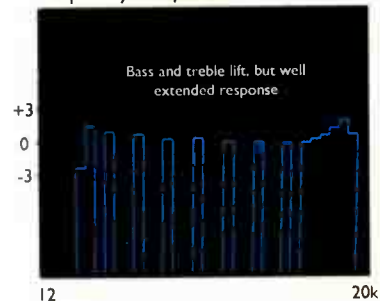
It was the first machine to provide a really solid bass line with Frank Zappa, but once again I'd recommend that the "max" setting on the "megabass" is unnecessary.

Like the Aiwa, the sound of the Sony was smooth and yet still sufficiently detailed to provide a fine insight to whatever music was being played. It proved less fiddly to use than the Aiwa, but turned in a classy performance to match its looks.

I expected something special with the Sony, since the company has produced more personal stereos than any other.

The WM-EX606 looks very similar to the Aiwa, yet more restrained - it oozes class. It has plenty of features too. Replacing the "sound processor" on the Aiwa is a two stage "megabass" system. Also, there is a music search facility which

Frequency Response



The Sony should have a bright treble and powerful bass.



PANASONIC RQ-570 £149.95

Despite the Panasonic being the most expensive machine, there is nothing to distinguish it visually from the Aiwa or Sony. It's beautifully designed, though, with each control giving a sense of purpose, especially the 'open' catch which is like something from a jewellery box, and the two part sliding cassette lid.

Features are very similar to those of the Sony, but with a twin rotor motor and the most bizarre equalizer system I've seen on a personal stereo. Settings include "normal", "heavy", "town" and "train" - somebody's thought about this one!

Even more amazing is the LCD display which is actually part of the remote located on the headphone lead. It graphically shows the equalisation levels for different settings and then, whilst the music is playing, displays LCD musical notes.

One nice feature is the sturdier than normal headphone jack plug, due to an extra collar (in the style of a phono plug).

The sound quality of the Panasonic proved to be something of a disappointment. For starters there was a very limited volume range. I often found myself listening at full volume on pre-recorded tapes (and I'm not usually a head-banger!). Jazz at the Pawnshop was more like it had been on the cheaper

machines; lacking in detail and rather recessed sounding.

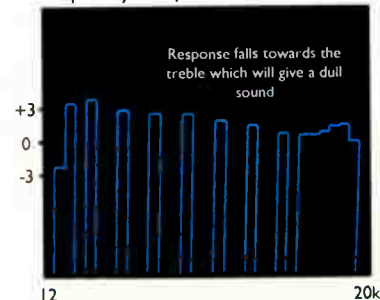
And classical music didn't fare much better either. Chopin sounded lifeless and less stable than it had on the Aiwa and Sony. Even a well recorded piece sounded flat and undynamic. One saving grace was that at least the speed appeared accurate. The sound did open out considerably with the superior 'phones, but it still couldn't quite match the Sony and Aiwa players overall.

The equalisation settings were also rather crude. The "train" setting sounded awful - just like a poor £30 machine. Panasonic have obviously tried to eradicate the "nuisance factor" of leaking headphones with this setting. Whilst achieving this though, they have also eradicated what little treble detail there was.

The Panasonic's wonderful styling made me want to like this machine, but the bland sound quality, lack of power and ineffective graphic, means that I can't recommend it.



Frequency Response



Response tilts downwards towards the treble suggesting a dull sound.

CONCLUSION

You can't have your cake and eat it, it would appear. Although none of the players were shockingly inadequate,



neither did any of them manage an unimpeachable performance. Not one came close to showing what is possible from tape. Having said that the Aiwa, Sony and Panasonic are as much about style and status as they are about sound quality. Out of these three (or indeed out of the six) I'd choose the Sony, with the Aiwa not far behind. I felt the Sony offered the best blend of style, sophistication and sound quality that you could expect from a player of this price. It was also free from the major flaws which

affected the Panasonic.

By contrast, the Panasonic had a long list of black marks (especially the basic equalizer), and yet the sound quality didn't compensate. The Aiwa took the middle ground and wouldn't disappoint. Its standard headphones also gave the distinction of being the best on test and easily able to match the machine's performance. Slightly fiddly controls did let the side down a little though.

One problem with all three of these machines was that legends became almost impossible to read in poor lighting conditions - something to remember if you're going to use a personal stereo in dingy light.

Of the cheaper machines, I'd have no hesitation in spending the extra money on the JVC. It offered the most rounded sound and had surprisingly good pitch stability. Styling is bland, but at least everything fell to hand naturally.

Philips' AQ6426 was totally the opposite. It had smart and practical

styling, but the odd ergonomic flaw and rough sound quality let it down. The Sharp actually sounded a little better. Although you can't expect much for what is the price of two CDs, the sound wasn't too bad; this player offers exceptional value for the casual listener.

It's important to note that all three budget machines sounded far better when their standard 'phones had been ditched in favour of something a little more "hi-fi"; try using Audio-Technica ATH-L1as.

If you are serious about music on the move then save up and buy a Sony Pro-Walkman which beats all these machines hands down, except on size and power consumption. However, it is twice the price of the most expensive here, and so comparison is a little unfair. I felt that the JVC or Sony are best to while away the hours on the beach.



Measured Performance

The frequency response of these players simply tells us whether they reproduce low and high notes at the same level as all others, giving correct tonal balance and avoiding a dull or bright sound. To indicate this condition, all the vertical blocks in our response analyses should be at the same height and on the more expensive machines - notably the Aiwa and Sony - they are. These players will give the most balanced sound with good, but not excessive bass, plus a fine sense of clarity. As Dominic Todd advises though, they really deserve good headphones to be fully appreciated, better quality Sennheisers and Beyers being good choices.

Personal stereos don't hold speed very well, with the notable exception of Sony's direct drive machines like the WM-DD3 and Walkman Pro. You'll hear 0.2% of wow and flutter (cyclic speed variations) as shake piano notes and quivering vocals; it can be annoying or, with Chopin Nocturnes for example, positively destructive. For ordinary uncritical work, 0.2% W&F is sort-of-acceptable. However, 0.1% or less is necessary for real pitch steadiness and not one of the machines here reaches such a standard, in spite of price.

Reducing battery size improves portability, but it compromises both output level and battery life. Size R6 (AA) pen cells are best; miniature AAA batteries last little time when

asked to supply 100mA to a motor. With this current consumption and an end point of 1.1V, around 6hrs life is available from an ordinary (i.e. not a Duracell) AA battery. Where a player, like the Panasonic, won't work below a high end point (1.35V) duration is shortened. JVC's CX-8 utilises batteries well; the other players were around average, conking out with battery volts 75% down.

Dominic Todd notes that some players were just loud enough flat out; the output figures show why. The expensive Panasonic delivers half the output of the budget Sharp; under its slick packaging this machine hides some significant compromises. **NK**

TEST RESULTS

Make & Model	Frequency Response	Speed Accuracy	Speed Stability	Current Consumption		Supply	Minimum battery volts	Output
				PLAY	WIND			
SHARP JC-212	200Hz-5kHz	-0.8%	0.2%	120mA	185mA	3V	2.2V	700mV
PHILIPS AQ6426	75Hz-13kHz	+2%	0.2%	128mA	155mA	3V	2.15V	610 mV
JVC CX-8	150Hz-3.5kHz	1.0%	0.12%	100mA	130mA	3V	1.9V	490mV
AIWA PX727	60Hz-20kHz	0.7%	0.2%	88mA	200mA	2V	1.5V	600mV
SONY WM-EX606	35Hz-18kHz	1.5%	0.16%	139mA	230mA	1.5V	1.15V	390mV
PANASONIC RQ-570	35Hz-16kHz	0.3%	0.2%	129mA	180mA	1.5V	1.35V	360mV

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Eric Braithwaite, *Hi-Fi World*, February 1993

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WHO INVENTED THE WALKMAN?

Many different tales surround the invention of the Walkman.

Simon Cooke has his own views on who invented the personal stereo.

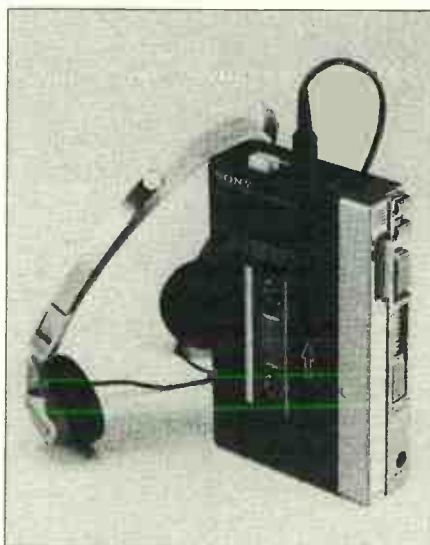
So there you were, bopping away to the Walkman and thinking that these Japanese are really clever guys, and never dreaming that the concept of personal stereo was invented by the Italians. You see, Personal stereo was invented during the Renaissance, by a Venetian trying to get noticed on the way to a masquerade ball. He hired a couple of musicians to follow him around, strumming and playing so that his expensive new costume would get noticed. The idea caught on and, in those days, a really high-class personal would even drag you out if you fell into a canal. The coming of grand opera killed the whole idea, however, because a lot of blokes got very uneasy about their wives being followed everywhere by a couple of strapping gondoliers singing 'O Sole Mio'. The whole idea went out of fashion, and the gondoliers went back to their boats to await the invention of the Cometto.

The rest is history, of course. The manufacture of the first Sony 'Walkman' is the stuff of legend, a story of internal politics within the company, of how the Sony Chairman, Mr Akio Morita, tried the prototype in July 1979 and liked it so much that - since he didn't need to buy the company - he ordered production to be rushed forward, so the first 'Walkmans' hit the shops just two weeks later.

The details of this story vary slightly, but it is essentially true. Sony, however, do not claim the credit for inventing the Walkman. They were in litigation with a German inventor, Andreas Pavel, who claimed that Sony had breached his March 1977 patent for a personal stereo. Sony won this case with a defence which stated that, since Nakamichi had produced a personal stereo-like cassette player in 1974, before the patent was issued, Andreas Pavel did not invent it. The Nakamichi player, the DT-350, had all the facilities of a portable stereo, such as a carrying strap and headphone socket. It also came with a rechargeable lead/acid battery; not quite as user friendly as Duracells!

The DT-350 did not record, but it's

sibling, the DT-550, did, and the important point is that, although they were intended for professional use, they could be used for entertainment; in fact the '350 was meant for this purpose. So the modern minstrel, definitely a wife-friendly model,



was re-invented by Nakamichi something like six hundred years after the birth of this idea. But you have to say that the original form indisputably offered better sound quality.

Sony brought the Walkman to Britain in 1980, calling it the 'Stowaway' and it sold well.

Since then, sales of personal stereos have increased every year, although Sony has obviously lost out on market share, as their rivals have

brought out their own versions. They couldn't copy the name, though, since 'Walkman' is a Sony trademark, and so

everybody else is stuck with the cumbersome 'personal stereo' but that hasn't stopped those clever little designer chappies from trying to beat Sony at their own game by cramming ever more facilities into ever smaller cases.

The first basic 'Walkman' took a while to become sophisticated, due to lack of competition, but the rapid rise in popularity of these little gizmos benefitted all the manufacturers. Personal stereos, although popular from their inception, only really took off in about 1982/83, when Sony's competitors actually started competing in the R&D stakes.

Sony soon lost their exclusivity due to the vigour with which their competitors made up lost ground. This still pays dividends for Sony, however, in terms of the kudos which their 'Walkmans' have, and the ubiquity of the name. It is forever associated with Sony, an attachment strengthened by the production of upmarket models of superb performance, like the legendary Walkman Pro.

Funny thing, business: Sony have launched a whole range of 'Walkman' products, like 'Watchmans' and what have you, that rely on the strength of that first success. Yet it in turn relied on the Philips Compact Cassette (after all, who'd buy a reel-to-reel Walkman?). These two companies have had a neat symbiosis going for the last 13 years, yet what

happens? The next stage of product development leaves us with CBS (as was) titles not being released on Philips' DCC system, and Polygram (owned by Philips) similarly shunning Sony MiniDisc. If

they keep this up, we won't see another success like the 'Walkman' for a long, long time ●

WALKMAN SALES (WORLDWIDE)



The Magnums seemed to take delight in surprising me, and making me leap across the room to check my wiring skills, in case I had done something wrong. You can, I suppose, take that as reading that the Magnums are not a relaxing speaker; I probably got a whole month's worth of exercise in the time that I was listening to them, but I can't say that they had me dancing around the room with delight.

So what do you get for your £190-odd pounds? Two lightweight and hollow-sounding boxes, each with a 200mm polypropylene bass driver and a 19mm aluminium-dome tweeter, both made by Goodmans Loudspeakers Ltd. Behind the tweeter in the back of the box lies a large reflex port and below it two binding posts, which are irritatingly angled downwards at about 45 degrees so that, if your gold-plated bananas are, like mine, not in the spring (sorry) of youth, all you need do is raise the volume, and your speaker cables will be shaken out of the sockets to slide gracefully to the floor. It's a small point, I know, but an aggravating one - and it could short out your amplifier, with disastrous consequences.

Once I had set the Magnums up, they gave quite a good account of themselves - at first. Their timing was crisp - until I threw some really complex vocal arrangements at them - and the tonal quality acceptable, which surprised me as I don't generally like polypropylene drivers. To me they usually make everything sound thin and plasticky. The only time this occurred with the Magnums was with Jan Garbarek's sax on 'Chorus' (ECM 1288). The top end was unfortunately splashy, and could be quite painfully shrill on transients and strings, especially steels. This seems to be a tendency of metal dome tweeters.

In the upper-midrange the Magnums tended to be rather forward, kicking out

piano and sax notes in this register with violence, so as to disrupt the image description. In the lower midband, the speakers behaved themselves, but gave quite a grainy presentation. Down amongst the bass notes, the Magnums seemed to lose all interest in the music, giving an empty performance without any 'kick' or drive. I tried numerous CDs which have, in the past, pinned me to my seat with the bass. With the Magnums, I can only report that I had no trouble

"Driven by an integrated Creek amp the Magnums sounded as though they could party all night and off into the sunrise."

standing up to raise the volume or, once again, to check my wiring. The bass response was so flaccid in fact, that the 'Mouth Music' CD (TERRACD 109) had the driver flapping, producing little impact, and that at no very high volume level on the amp, so the system wasn't under strain.

The strange thing is that not all of the traits which I have mentioned above seemed to be particularly consistent with, for instance, harp strings being portrayed with bitter astringency, and yet solo violin, which suffers at the hands of most hi-fi, giving a quality performance. Another wiring check . . .

The overall feel of these speakers was not an inspiring one; they never really seemed to want to come out of their boxes and sing. These are not speakers for Zen novices like myself who harp on for hours about imagery and sibilance, bass response and subtlety. No. These speakers are not for those shrinking violets who daren't even switch their hi-fi on for fear of popping an expensive tweeter. These speakers are made to do one thing: PARTY! The harder you drive them, the happier they sound, until you just can't be

sure whether the sibilance is coming from the speakers, or whether it's just the volume ringing in your ears, or even the amp in agony.

Driven by an integrated Creek

amp the Magnums sounded as though they could party all night and off into the sunrise. Then the amp's overload protection cut in, warning me to back off. The speakers could take it; the amp had had enough. The Magnums need a powerhouse to keep up with their ability to absorb power, if you want real volume.

They aren't Cerwin Vegas, just giving a nice, easy and, above all, loud performance, and although they may well worry the neighbours, they just don't derive enough real bass to risk structural damage to your house, yet there is just enough to give reasonable kick to the music.

There you have it. Although the Magnums

MEASURED PERFORMANCE

I measured the Magnum after listening to it, to find my comments about its sound largely vindicated. It does have a suck-out at 200Hz, as predicted from listening, but it is an interference suck-out. The near field response of the bass/midrange unit rises steadily toward low frequencies, showing no sign of this problem. Yet from a distance, the suckout exists, at any position in the room. I suspect it comes from port cancellation, even though the port is tuned low, to 30Hz. Stuffing the port with damping material lessened the suck-out, but it also weakened low bass.

The bass/midrange driver itself peaks at 120Hz, then it rolls off at lower frequencies,

leaving the port to fill in. It doesn't do this very effectively, because it is tuned too low. The overall frontal response, which reasonably accurately reflects what a listener would hear, can be seen in the response analysis. This shows the bass peak at 160Hz and low levels either side of it. It's an unusual looking characteristic, one I have not seen before.

This result explains why the Magnum's bass sounded so unusual. It has a basically falling output below 300Hz, punctuated by resonance at 160Hz, plus port output down around 30Hz. This means there's light bass, accompanied by heavy bass at two different frequencies, that is, when 30Hz signals exist in the music, which isn't often. In real life it's pointless to tune a port

much below 45Hz. When you add in the effects of room interaction, then the picture becomes as complex as I suspected when listening. Quite simply, the Magnum needs sorting.

The causes of other subjective characteristics are apparent further up the frequency range. Lack of any sense of real detail or analysis is explained by low output around 6kHz, whilst the slight occasional spit of the tweeter is due to the mild resonant peak visible at 10kHz.

The polypropylene bass/midrange unit reaches 1.6kHz - a relatively low frequency - before crossing over to the aluminium dome tweeter. This means the latter handles more music power compared to usual, since it covers more of the audio band. It also puts the crossover frequency further into the

MAGNUM

Goodmans first Magnum loudspeaker was a force in the market

Simon Cooke and Noel Keywood see whether its new replacement

FORCE

place during the 1970s.

will be as potent.

are built to party, there are still speakers making a more happy noise for less money. Goodmans have obviously tried to carry the strengths of the Maxims, which we like so much, up into the £180 arena. It hasn't really come off though. The Magnum has lost much of what the Maxim has, or it has just twisted it into an unrecognisable form. At this price level, hi-fi customers tend to want something more than just plain volume, looking for a 'speaker with rather more subtlety and finesse than the Magnums are capable of delivering I believe. SC



Noel Says

Goodmans' original Magnum K-2 loudspeaker was a real rocker. I used to throw them over the counter all day Saturday at an Edgware Road hi-fi store in London; people couldn't get enough. It was a dynamite value three-way that really delivered the goods.

The new Magnum was meant to revive this success in Goodmans Loudspeakers latest product range. Knowing and liking the Maxim I had every confidence it would, but I have to say that my hopes have been dashed. The new Magnum is beset by problems that ultimately compromise its performance by a significant degree. It gives a box-bound sound, that is quite rich and full, yet tinged with occasionally sharp treble from a not-too-clever aluminium dome tweeter and weighted down with peculiarly slow bass devoid of impact.

I tried to specifically identify the problems (before measurement), but they seemed elusive. The Magnum appeared to lack deep bass on some tracks, then on others there seemed no shortage of it. It had a weighty sound, but yet no real impact. It was oddly slovenly in its bass, yet there was enough togetherness to reproduce Tina Turner's Break Every Rule - a notoriously difficult bass line - with some all-round ability, if not with great precision; I've certainly heard a lot worse.

In the end I had to conclude that the Magnum has not one major weakness, but numerous smaller ones that combine to act in a complex fashion, according to the music played. There's a hint of low-ish bass emphasis, probably from an under-damped enclosure, that adds some slight bass boom and a certain amount of one-

note emphasis. There's too much return energy coming out of the box and too much wall flexure contributing to it, creating drone. Put all this together and you get a messy sound at low frequencies, poorly controlled. Lack of bass speed is usually down to low upper-bass energy, around 250Hz, often caused by a shallow suck-out.

If the midband and treble had been more vivacious and appealing, then the bass end of things might well have received less attention from us. As it stands though, the Magnum I would rate as only reasonable at the price. It's basically competent, but it really needs a little more pizzazz if the nation's shop counters are once again to get buzzed by low flying Magnums. NK

ear's region of high sensitivity, which doesn't help integration subjectively, where plastic matches metal.

Overall impedance measured 8ohms, but minima in the impedance curve were low at 4ohms (see the analysis) with the value below 2Hz sinking to a DCR minimum of 3.7ohms - a very low value. By the IEC rating method (1.25 x minimum over working range), this is a 5ohm speaker. The voltage sensitivity of 88dB is quite good within these conditions; compared to other speakers the Magnum goes loud at any particular volume setting.

My view is that the Magnum needs re-tuning and possibly re-proportioning to get more balance and lessen various anomalies. NK

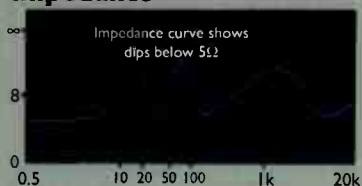
Frequency Response



12 20k

The frequency response analysis reveals some problems.

Impedance



Overall impedance measures 8Ω, but in places the curve dips down to 4Ω. The curve also varies steeply indicating strong reactance in the load.

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Defining Dynamics

The new Definition Series D700 loudspeakers from Tannoy give Dominic Baker a lesson in dynamics.

Looking and feeling as if they were hewn from the trunk of a rosewood tree, Tannoy's new Definition Series D700s are not the kind of loudspeakers that would innocuously blend into the corner of a room. Their beautifully polished wood, gold Tannoy badge and impressive stature beg to be on show for all to marvel at and aspire to. Quality like this doesn't come cheap, but thankfully interest rates are low and loans easy to acquire.

The Definition Series are a statement by Tannoy of what is possible from their well known and respected dual-concentric drive units. The first example is the D700 which has Tannoy's latest development of the dual-concentric unit, complemented by a 10inch bass unit handling the lowest frequencies. Coming soon will be the D100, a stand mounter using a 6.5inch dual-concentric unit covering the full audio range.

Tannoy have been developing their dual-concentric drivers ever since they first used this principle in the 1950s. A dual-concentric consists of a traditional cone shape with a centrally mounted tweeter. This effectively produces a full range, point source loudspeaker. It means that they will not 'beam' off axis in the way that conventional, separated tweeter/woofer systems do. In addition, the sharpness and focus of the stereo image can be improved by a point source.

Weighing in at 41kgs a piece and £1970 a pair, the D700s are a substantial piece of engineering. The cabinets of our review pair were exquisitely finished in real rosewood veneer, but the curved panels give the impression that they have been honed from a solid block. The sides angle inwards towards the rear, which helps to reduce the build up of internal standing waves and, therefore, box colorations. On the slim rear face sit Tannoy's unique bi-wire binding posts with captive links for single wire connection and two - relatively small given the size of the enclosure - reflex ports.

As you may have already guessed from their size, these speakers are designed for 'free-space' positioning. Man-handling them takes quite a bit of effort and could



be potentially quite dangerous if, like me, you put the spikes in first. Since 41kgs pushing down on a spike constitutes a considerable pressure, I would recommend making sure they are best installed by a friendly hi-fi dealer.

Fortunately, the D700s required no running in (something that would certainly have been a deafening experience); Tannoy's Marketing Manager, Ken Weller had been using them for around six weeks before we took delivery. The D700s are well extended at either frequency extreme and will quickly show up any source/amplifier that is vague and lacking control in the bass, or gritty at the top end. There is a lot of cone area to deal with and the strongly varying

impedance suggested that a transistor amplifier would be their best driving partner. A valve amplifier would struggle to drive these speakers at their best, even given their whopping 93dB sensitivity. This was a bit of a shame; at times the treble from the concentrically loaded tweeter could become knife-edged, a property a clean sounding valve amp may well have blunted.

After experimenting with several different amplifiers and DACs I had the D700s running beautifully, placed 3ft from the rear wall and two feet in from the sides. They were as fast and dynamic in their delivery as Tannoy's literature suggested they should be. It's strange how, after listening to a great number of loudspeakers, you can predict the basic sound and character of a 'speaker before even plugging it in. Polypropylene drive units have a particularly strong character to them that gives a smooth, rich kind of flavour to the presentation. The D700s were no exception here, and in this respect they could not be described as having a neutral personality, but then all drive units suffer from some sort of coloration due to the material used for the cone.

One thing that instantly struck me about the '700s is the way the three units integrated together. Having the tweeter concentrically mounted in the centre of

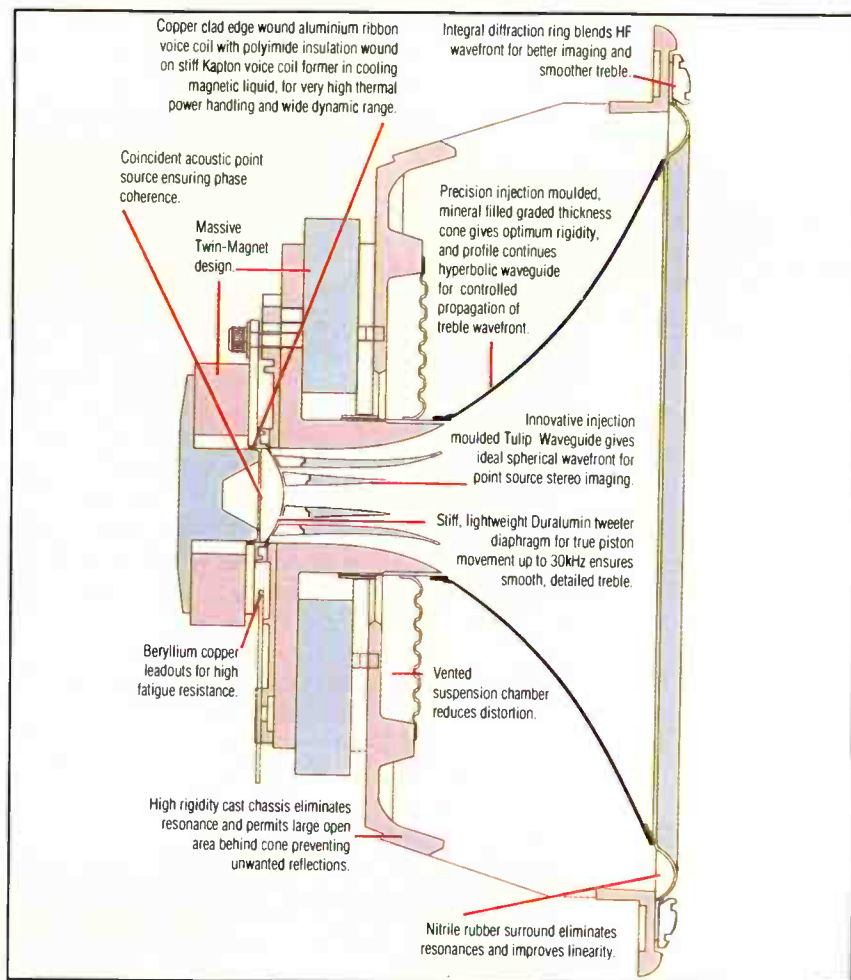
the midrange driver ensures that they represent a near point source. This gives them some of the qualities of a good

integrate a 4inch mid driver with a 10inch bass unit, especially if one is paper and one plastic, for example. Using two very similar units means that their characters will be near identical at the crossover point, making the task easier and the outcome successful.

As is the temptation with all floorstanders, let alone one which the manufacturers are marketing as a statement in definition and dynamics, I chose a CD with a powerful bass and plenty of attack. The Beloved's 'Happiness' album is recorded with a strong, dynamic, fast and powerful bass of the electronic variety. Here the Tannoys delivered everything they promised: huge but firm bass with plenty of attack and a sharply focused mid and top that was projected out, deep into the room. Not once did they become confused or disjointed; in fact they seemed to be smugly confident, teasing you to try

more. Even at high levels - and they go incredibly loud if asked - everything stayed firmly in place; these speakers were not bothered by my frantic attempts to find something that would trip them up.

One track that always seems to beat most loudspeakers is the Blue



miniature, such as improved focus and imagery, creating a remarkably coherent 'speaker. The mid-range driver crosses over very smoothly into the bass. One of the reasons for this may be the choice of units. It is much more difficult to successfully



Tannoy's Dual Concentric drive unit is set in a tapered cabinet.

Aeroplanes, aptly named 'Here It Comes'. On this track, the drums take the lead with a bass guitar coming in after a few bars to form what is, on most 'speakers, a deep underlying drone. The D700s were having none of this. Reaching down, they grabbed hold of the bass line and gave it the definition and ability to stop and start cleanly that I have only heard before from Celestion's SL6000 system.

Moving on a few tracks on the same album to 'Missy Lane', which is a comparatively simple track to deal with, the '700s continued their positive attitude. The treble was tonally detailed and clear enough to allow the cymbals to be easily followed note by note, even with a snare drum being struck alongside.

Where these speakers performed like few other floorstanders was in their ability to sharply focus a performer and the members of a band to produce a convincing image across the whole stereo stage. They are not quite in ESL63 territory, but are as close as many other moving coil loudspeakers. Tanya Donnelly stood tall and proud between the Tannoys, with drummer slightly left and to the rear, bass guitar to the left and lead to the right on Belly's album, 'Star'. The ability of a loudspeaker to conjure up a convincing image like this within a large sound stage always makes its reproduction that much more believable for me.

The overall sound of the D700s is one

of great confidence, but there are faults, as with any loudspeaker, to be found. As I

"One thing that instantly struck me about the '700s is the way the three units integrated together."

mentioned earlier, unless careful choice of partnering equipment is observed, their sound can go to pieces. I chose to use them with Audiolab's new 8000DAC, which has a flat response and a smooth sound, and with DPA's now discontinued 50S pre/power amplifiers, which have very low distortion. Given this kind of treatment, the slight sting in the treble, that could cause fatigue, was nicely tamed and the combination of the amplifier's grip and placing of the D700s in free space removes any chance of boom from the bass. I suppose what I'm really trying to say is that the D700s, because of their nature, are critical of source equipment and positioning. They are a high definition loudspeaker and will quickly show up weaknesses, but in the right system you would be hard pushed to find such a powerful sound.

Admittedly, Tannoy could probably produce a 'speaker that did the same job

for around two thirds of the price of the D700s by skimping on the fancy cabinet work. However, what you are buying into here is an exclusive club where pride of ownership rules. It's a bit like buying a TVR; sure they could make something as powerful for less, but the leather interior, hand finished details and respect that comes with the name are all part of the finished product.

For a handful of people out there, looking for power and performance from their system, the Tannoy D700s should fit the bill. I have to say that they are not for me; I like the midrange to come just a little further forward, the bass to be a little dryer and the overall presentation to be leaner. And my room is of reasonable size and commonly makes speakers sound a little drier in their bass. The D700s should be used in a large room to get the best from them. More than other items, speaker selection comes down to personal choice. In spite of my own reservations, I wouldn't think twice about recommending them to those who want Rock power with a studio monitor presentation. In this respect, there isn't a lot to match them ●

Tannoy D700s - £1970
Tannoy Ltd.
Rosehill Ind Est.
Coatbridge, Strathclyde ML5 4TF
Scotland 0236 420199

MEASURED PERFORMANCE

The Tannoy D700s are unusually sensitive for a domestic loudspeaker; for a small signal voltage they will go very loud. Producing 92dB at 1m for a 2.83V (nominal 1watt) of input, they will overpower nearly all other hi-fi speakers, with the exception of horns, at any particular volume setting. This would appear to make them ideal for low power transistor amplifiers or valve amps without feedback - but not so. The Tannoys may be voltage-sensitive, but they are not especially efficient, achieving high sensitivity by having a low impedance, which in turn draws lots of current from an amplifier.

Their overall impedance, measured using pink noise, was just 4.5Ω. If this is the average it suggests that there will be places where it drops well below this figure. Plotting the impedance curve showed this to be the case; below 200Hz the impedance curve stays well below the 3.6Ω line and in fact comes to rest at d.c. with a value of just 2.4Ω. Above 200Hz the curve rises rapidly to a peak at around 3kHz before falling steeply downwards. This indicates that the D700 will be a reactive load

and may cause low power amplifiers, especially zero feedback designs, some trouble.

Because of their low impedance and reactive nature, I would recommend a high quality solid state amplifier of at least 50watts, even given their high sensitivity. Especially since these 'speakers have been designed to have a wide dynamic range and will doubtless put quite heavy demands on an amplifier with transients.

Frequency response was reasonably even in nature, but not exceptional, given the price. The overall trend is one of bass and treble rise with a long shallow dip in the middle. The long shallow dip of around -3dB will be more audible than one sharp dip of twice the magnitude (6dB). When I listened to the D700s the midband did not project as much as I would have liked, doubtless because of their frequency response. Still, the speakers did not sound uneven.

The D700s do not measure particularly well, but then most high end products have their quirks and as the subjective analysis shows, if care is taken over the choice of partnering equipment, the results will be favourable. **DB**

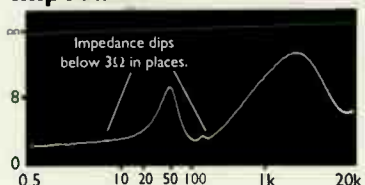
Frequency Response



12 20k

The D700s have a long shallow dip through the midrange followed by a treble peak.

Impedance



The impedance curve dips right down below 3Ω in places.

Peerless CC FORCE

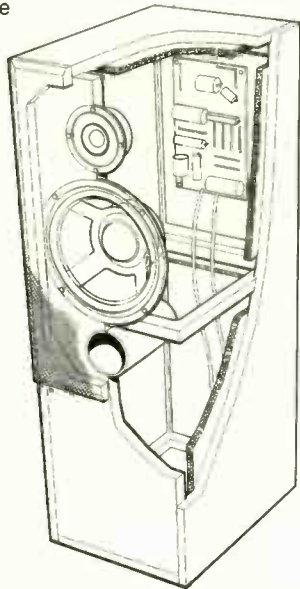


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Twenty five years ago I was bewildered by the lack of interest or the ability to teach basic electrical and electronic theory at school. Even then the world was moving forward behind advances in electrical engineering, especially in aerospace. Yet in the prim, respected, but in truth educationally deprived grammar school I went to, the subject didn't exist. I taught myself from books and built a string of radios and amplifiers until I could flee a narrow and parochial environment for a wider world. Not too far away, in Bristol, Concorde was being built; I guessed rightly that that was the place to be if you wanted to be an electrical engineer.

In retrospect it seems desperate and absurd, yet I'm not certain much has changed. Now, when even our leisure relies upon electronic engineering in its purest form, as Nintendo and Sega demonstrate, and as computers and the machines they control become increasingly important to us, electronics as a subject remains secondary to the traditional trinity of maths, physics and chemistry. Spending hours messing around with hideously dangerous chemical elements at school, like potassium and sodium, seems bizarre, when out in the real world they're not even generally available and can only be used under the most

cars to Concorde.

So why are we continuing to ignore electrical engineering and electronics as an important core subject in the national curriculum? Whilst vocational training isn't the primary responsibility of our schools, it nevertheless exists within them. I suspect in fact the institution of maths, physics, chemistry and woodwork, plus metal bashing, is a Victorian vocational curriculum enshrined into the school system and now taken for granted. It doesn't seem to fit in with any modern view of the outside world and what it requires of us in adulthood.

My objection to this curriculum is its apparent priorities, rather than its content alone. Let's take the subjects of chemistry and woodwork, both of which I personally find interesting. Our schools come well equipped at significant cost with chemistry labs and wood-working/metalworking shops and naturally enough a commensurately large amount of time is allotted to the teaching of these subjects. But how vocationally useful is woodwork going to be for example? How many carpenters does the nation need? When the British fleet was built of oak, quite a few, but those days passed rather a long time ago. Commercial woodworking on any scale is these days carried out by machines, computer



Reflections from Noel Keywood kaleidoscope

We should not be placing so much emphasis on these subjects at the expense of electrical engineering and electronics. Modern schools should have electrical engineering laboratories which, thankfully, are not necessarily expensive to equip. If schools can afford lathes, tools and furnaces, they can also afford a few £200 oscilloscopes, some cheap multimeters, signal

through to design and manufacturing, with electronic (DTP) publishing thrown in to add variety, that illuminates problems in the way the subject is taught. Let me give you a few examples that have come up recently.

How can qualified electrical engineers apparently understand the Fast Fourier Transform, but be unable to understand or design simple audio circuits? Simple, I was told, they chose electrical engineering as a career, without having any innate interest or understanding of it beforehand. I met a company accountant not so long ago who sheepishly admitted that he had given

"Out in the real world we are confronted by electrical paraphernalia, not by lumps of sodium whizzing around in circles in jars of water."

elaborate safety conditions; this aptly illustrates my point. Where are the electrical and electronics experiments? Out in the real world we are confronted by electrical paraphernalia all day long, not by lumps of sodium whizzing around in circles in jars of water.

Modern machines are nowadays commonly electronic at heart (or should I say 'brain'); the simple purely mechanical machine hardly exists. There's obviously a great and expanding need to design, manufacture, service and repair electrical and electronic equipment, either stand alone items like radios and computers, or control and communication systems within everything from washing machines to

controlled of course. There's little vocational value in woodwork and we certainly can't afford the luxury of teaching leisure/DIY activities at the expense of more important vocational skills.

Chemical engineering is a different proposition, but yet again I have to question whether we need so many chemical engineers to be devoting such resources into the subject. If chemistry, with its hazards, is valuable enough to warrant such input, why not electrical engineering? For there's no general value in learning chemistry, as there might be for art, architecture or Latin; good dinner party conversation doesn't usually revolve around the molecular structure of the brandy.

generators and a few lengths of wire. A simple understanding of fundamentals, using easily understood water analogies, could and should be introduced before O Levels with the option to specialise after that. Then our schools would be equipping people to more ably understand and cope with the machines that they will encounter, like computers and cars, as well giving them the opportunity to choose a career in an increasingly common and important branch of engineering.

To us on the magazine electronics is a hobby, or in modern marketing speak - a passive leisure activity - as well as an important part of the magazine. It's our complete immersion in the subject, from hobby

up studying electrical engineering at university because it was too difficult. It can be, but it doesn't have to be. Electronics to him was a.c. theory, the Fast Fourier Transform, Bessel functions and other daunting concepts; it could have been building a radio and having the satisfaction of enjoying what it brings, or - even easier - building a hi-fi amplifier with similar or perhaps better rewards.

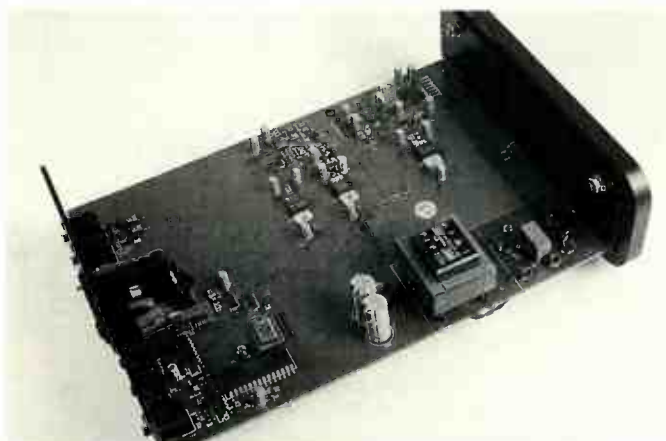
Now we get back to early and formative education. People dedicated to audio usually started out tinkering with electronics for enjoyment first - only later did it become a way of making a living as well.

And that is the simple, cheap and effective way of teaching the subject in the nation's schools, with all the potential benefits it can provide us. People of all ages, including teenagers, can associate with radios and amplifiers: they're a part of everyday life, especially leisure, and they bring enjoyment. They can be cheap to make, easy to understand, enjoyable to use and at the same time provide a fascinating learning experience.

There's been precious little change in the subject matter of the educational curriculum over twenty five years, even though the world outside has - and is - changing fast. Electrical and electronic engineering should be taught in schools; audio and radio is a fine way of doing it ●

Since buying a Little Bit digital convertor three years ago, I have become an unwavering DPA addict. It seems to be the best DAC at this price point, so when Hi-fi World offered me the chance to hear the new version - Little Bit II - my immediate reaction was to wonder why DPA would bother to upgrade what is, in my opinion, a budget benchmark.

Taking the Little Bit II from the box, I found it follows other DPA products in design. The front panel is adorned with one green power-on indicator LED and the DPA logo. It appears larger than that of the original version, because of its flat alloy panel with rounded corners, instead



of a deeply contoured casting with bevelled edges. When Deltec became DPA, this highly distinctive fascia was discontinued, being too troublesome to manufacture. In fact, the only differing case dimension is the depth, since the new version is 55mm. deeper. The rear panel contains the same power on/off switch, co-axial input and channel output sockets as the original, as well as an optical TOSLINK input. What's new is a Deltran output socket for sync. locking the DAC to a transport and a small chrome switch which, looking somewhat like a designers' afterthought, defeats the Deltran facility if desired.

Enough of the aesthetics, what about the sound? The most important thing to me was that, in general, DPA had not digressed much from that of the Little Bit; in fact, the similarity on first impression was so close that I thought I had managed to connect one of the DACs through both of the amplifier's inputs. On more careful listening, however, the differences began to mount up. Primarily, it became apparent that the image portrayed by the new model was cleaner than that of the earlier one; bass lines were tighter and transients better held from flying off at the top, which reduces the fizz apparent on rapidly struck cymbals, for example.

This neatening of the presentation made small details more easily audible, such as the background breathings and tappings on Tom Waits' *Swordfishtrombones* album (IMCD 48). These details

A LITTLE BIT MORE

Simon Cooke listens to the latest version of DPA Digital's Little Bit CD convertor.

are there to be picked out when played through any competent DAC, but they were more easily discernible with the Little Bit II.

Similarly, the sound of fingers brushing strings on Alan Stivell's *Renaissance of the*

I mean felt. DPA's DACs are considered, by some, to be too clinical in their presentation, too cold. The Little Bit II conveys a quality which I hesitate to describe as warmth, since it has none of the softening of tone which is so often associated with this term. The new DAC is seemingly transparent, but the clinical quality is softer than before. A poetry has been introduced.

For example, on track 6 of *The Second Set*, by the Scott Hamilton Quintet (CONCORD JAZZ CCD 4254), Chuck Riggs eschews the usual flamboyant drum

"it portrays single voices, large orchestral and rock arrangements with equal alacrity"

Celtic Harp (Rounder CD 3067) were easily separated. Such details may seem trivial, but it is in portraying them that the difference between DPA's older and newer product can most easily be felt, and

solo for a simple 'tap dance' effect of sticks. The Little Bit II presented this with enough space around the sticks to give a revealing impression of their movement, and it was not swamped by the answering

MEASURED PERFORMANCE

As ever, the internal layout of DPA Digital's Little Bit II convertor is exemplary. Surface mount technology, as applied by DPA, has raised the state of the DAC market. Miniature surface mount devices are neatly grouped around the board with the input circuits, power supply, DAC, filtering and output drivers all well spaced apart from each other to avoid interference.

The Little Bit II uses the bitstream SAA7350GP DAC chip to perform conversion. This is an up to date Philips device, only bettered in their range by the addition of an external DAC-7 one bit convertor. The frequency response of Little Bit II rolls off smoothly from around 5kHz upward. This will almost definitely produce a softer, warmer top end than normal, which

will suit those who are adverse to the glare of CD.

The distortion figures are a good margin better than those of the original model at all but the highest of signal levels. For example the original measured 0.4% at -30dB (normal music level) whereas the new design manages a quarter of this - just 0.011%. It yields an improved dynamic range which is some 19dB better than before, now measuring 105dB.

In other areas the Little Bit measures very respectably and consistently, the only thing not in its favour being a low output of 1.86V. Under demonstration conditions the Little Bit II will need a higher volume setting to produce the same output level.

Overall the DPA Little Bit II measures very well and is beautifully built. **DB**

tenor saxophone. Both instruments remained discrete and defined, yet precisely matched.

original Little Bit was its sensitivity to dirty mains supplies. Quite simply, it picks up everything, and even DPA's mains filter,

predecessor, although by no means a difficult partner.

In summary, then, the Little Bit II is a worthy successor to the mantle of starter product in the DPA stable, demonstrating the traits of their more expensive models at an accessible price. DPA DACs are designed to be noticeable only by default, preferring to stand back and let the recording breathe rather than stamp their character over the basic sound. In this they are reasonably successful, giving a clear, clean performance of any genre of music. It is especially involving for the kind of listener who wants an exact replica of the stage between the speakers, even if the character of the music is not necessarily to everyone's liking.

Now the under-£500 DAC market is becoming much more competitive, with the advent of products such as the Micromega Microdac and the Audio Alchemy Digital Decoding engine, the Little Bit II will have a harder time than the original version did when it was launched some years ago. However, by building on their foundation of clean performance within a well defined soundstage in this way, I feel that DPA can look to hold on to a good slice of this market for some time yet ●

DPA Digital Little Bit II - £450
DPA Digital, Unit 7, Willowbrook,
Tech Unit, Crickhowell Rd, St Melons,
Cardiff, CF3 0E1.
Tel: 0222 795621



The removal of jitter induced noise by the Deltran link also produced improvement to the soundstage presentation. DPA obviously consider soundstaging a priority, but cleanliness of the new presentation can take it to disturbing extremes.

A good example of this was the final track of the Mouth Music CD (TERRACD 109), which includes vocals recorded in a stair well. The soundstage dutifully spiralled upwards to follow the echoes, causing my ears to tell me that there was, quite literally, no ceiling. It is this solid and credible stage that provides the Little Bit's strength; it portrays single voices, large orchestral and rock arrangements with equal alacrity, nailing each source firmly in place before allowing it to sing.

I have probably eulogised enough about Little Bit II, so I should redress the balance. The main problem with the

known as The Power, could not totally eliminate interference. Fortunately, the optical linkage solves this problem, but even the upgraded RF filter circuitry does very little to improve the situation when the co-axial link is employed. On the subject of interference, my advice is simple: if you are not thinking of using the optical output, beware!

I only have one other small caveat, which is that the Little Bit II can sound a little thin if wrongly partnered. I used it with a TEAC R-500 Esoteric transport with Cambridge Audio C100/A70 amplifiers and Gale 301s. In this system the optical output fell prey to the astringent high end of the amplifier, whereas the co-axial output was gutsy enough to hold the fort. In this, the new convertor is probably a little more choosy than its

TEST RESULTS

Frequency response 4Hz-21.25kHz

Distortion (%)

-6dB	0.0056	0.0054
-30dB	0.011	0.011
-60dB	0.77	0.72
-90	37.7	35.1
-90dB dithered	13	12.5

Separation (dB)

	left	right
1kHz	110	110
20kHz	99	94

Noise with emphasis -102dB
 -105dB

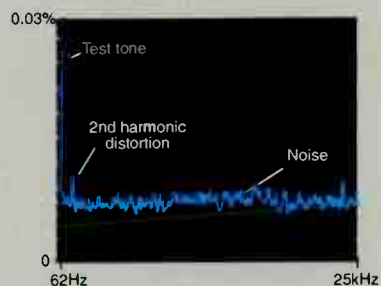
Dynamic range 105dB
 Output 1.86 1.87V

Frequency Response

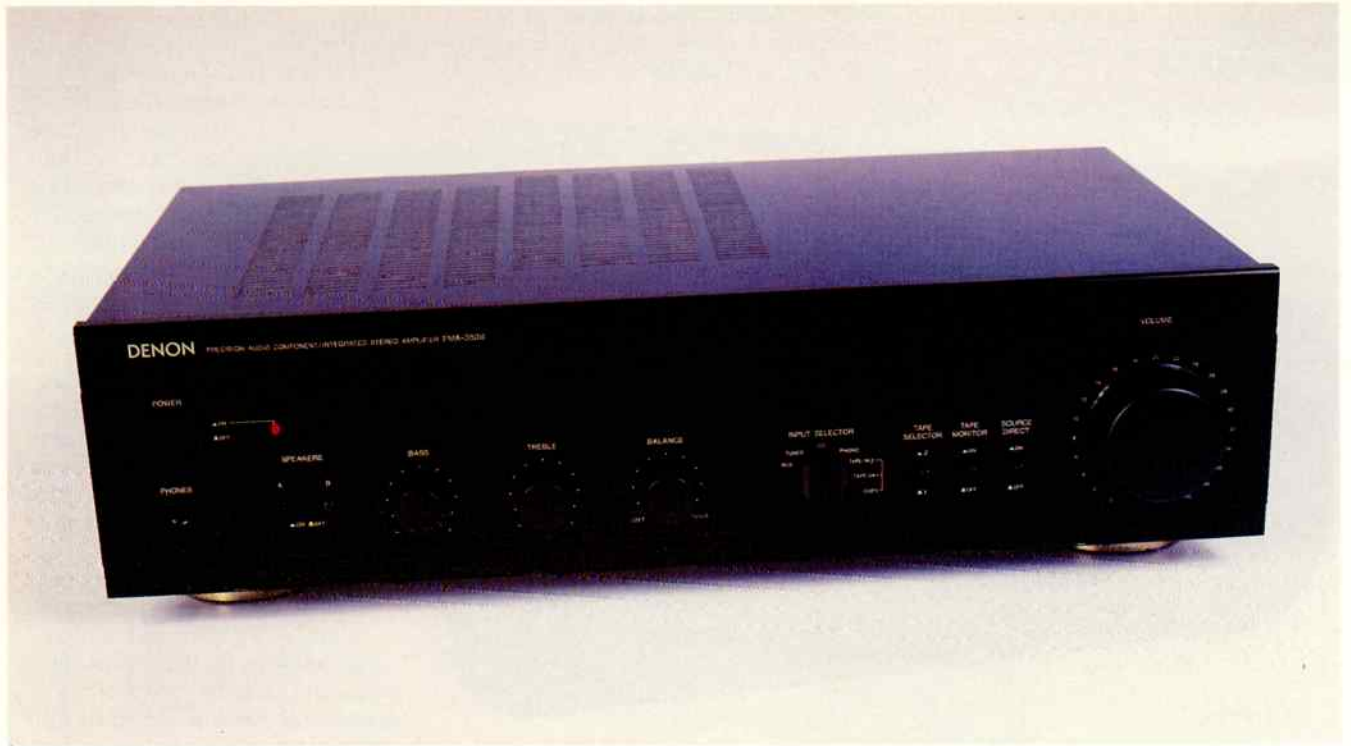


Response rolls off smoothly from around 15kHz.

Distortion



Highish noise floor and some 2nd harmonic distortion.



A WORTHY SUCCESSOR

We all liked the original Denon PMA-350 amplifier for its punch and detail, now Dominic Todd finds the 'II' has even more to offer.

Denon always seem to have been a little behind other Japanese manufacturers with hi-fi trends. They were late onto the scene with British-style amplifiers, following in the wake of Pioneer, Marantz, and Sony. Their latest incarnation is the Denon PMA-350II (yet another Mark II derivative!). It comes onto the market a full year behind the well received, improved Pioneer A-300X, a natural competitor.

This is not necessarily a bad thing; it could be argued that it allows Denon to stand back and take time to produce a well thought out product. Denon research shows many customers are unhappy with "stripped down" minimalist amplifiers (having experience of retailing, I'd say this is true). Therefore the amp is fitted with tone controls and speaker switching for two sets of speakers.

Other controls gracing the smart metal fascia include a smooth acting volume

control, balance, headphone socket, a source direct switch and slightly clumsy input and recording controls; one switch and two buttons aren't as effective as separate record and listen controls.

Whilst not being particularly heavy the 350 is nicely finished, better than an equivalent Pioneer or Marantz for

and audio-grade relays and you have an amp that also appeals to the audiophile.

After a thorough running in period I auditioned the Denon using a pair of well used Heybrook Solo's. A speaker which can be ruthless in showing up lesser amps, and requires the sort of power the 84watt Denon can offer.

Donald Fagen's new album was first to slip into the CD player. It's a well recorded piece boasting an extremely deep and powerful bass line.

The Denon really

brought these tracks to life. The bass guitar was reproduced in its fullness and the notes were sustained; what's more it had real depth and articulation of low frequencies. It's here that lesser amps often fail and end up producing one-note bass.

Yet this tightly controlled bottom end didn't come at the expense of the rest of the frequency range, nor did it ever dominate. Vocals were well projected

"The Denon really brought these tracks to life - it had real depth and articulation of low frequencies."

example (it's nice to see that the back panel doesn't bend when phono plugs are inserted). Yet the main change to substantiate the 'II' legend lies within. There is a new one-piece circuit board with careful signal routing, Ansar Super Sound capacitors in the phono stage and main power amplifier input, and plenty of oxygen free copper (OFC) wiring. Combine this with a substantial toroidal mains transformer, Cerafine capacitors

with the Denon allowing the speakers to image freely. If there was one black mark it was a slight steeliness between upper-mid and lower-treble that could occasionally bite.

This had less of an affect on female vocalists than I'd imagined. Jennifer Wames' "Famous Blue Raincoat" by Leonard Cohen possessed a clean and natural mid-range that reminded me of a good valve amp at times. I know it's been said many times before, but it really did seem as though Jennifer was there in the room singing live. Unfortunately the saxophone sounded a bit weedy and there was a touch of sibilance, but neither were really annoying and could be minimised by careful matching of ancillaries and cables. There were no problems with the double bass which reinforced the track as it should do.

With the slightly weedy saxophone in mind I tried a Danny Thompson piece (progressive folk / jazz) which would expose any flaws in the upper-midrange. On "Wild Finger" Danny's bass thundered along with real gusto. The alto sax was perhaps a touch stringy, yet it didn't seem to matter much as the whole performance was so musical and alive. Yet this didn't come at the expense of detail. Whilst the performance hung together well, the different brass instruments sounded just that: different. Each had its own clear signature which could easily be followed in the mix. Details such as the faint sound of a foot tapping in the background added to the ambience

without obstructing the listener's enjoyment of the piece.

Turning to vinyl and music of a more classical nature didn't dent my enjoyment of the amp. It had a surprisingly fine phono stage for a Japanese amp. Whilst

"Turning to vinyl and music of a more classical nature didn't dent my enjoyment of the amp."

only catering for moving magnet (MM) types it was reasonably quiet for an amp costing just over two hundred pounds. With Corelli 12 concerti grossi op.6, a recording of chamber music, the overall balance echoed that of the CD: a broad and deep sound stage with plenty of space for individual musicians.

Larger orchestral pieces showed that there wasn't the scale and dynamics of the line level inputs. Nevertheless, in many ways this is a blessing as many budget and even mid-range turntables possess a rather veiled and soggy bass response. The clean bottom end is the perfect antidote for arms such as the Rega RB250, which can wallow a little at these frequencies. Tailoring the phono board frequency range in such a way has also meant that there is little woofer flap that often bugs vinyl reproduction.

Whilst I respect Denon's decision, I tend to prefer amps without tone controls. All my listening was done with the source direct button pushed in, which did make a small difference to the separation of instruments. I found the tone controls were best left untouched as

they significantly altered the tonal balance if used heavy handedly.

What surprised me most about the Denon was the way it managed to be musical whilst still showing good technical presentation. A few rough edges around the mid-upper range are chinks in an otherwise highly polished musical armour. I also think the input / output selectors could be tidied up a little, but other than that have no complaints with the design of the amp.

However, anyone buying this amp should take care with matching components. Choosing an ultra smooth CD player or turntable and bassy speaker would be over egging the pudding. Not that the Denon is speaker fussy; quite the opposite in fact, it will happily drive difficult loads. Don't go away with the idea that here is the amp you've been looking for to fit between your SME20 and Naim DBL's either!

Whilst being a first class player in its price range, like all amps of its price it does move out of its depth with high end equipment. That having being said, I certainly recommend an audition and suggest it would make the heart of a very good budget / budget-mid range system ●

Denon PMA-350 II - £219.99
Hayden Laboratories Ltd, Chiltern Hill, Chalfont St. Peter, Bucks.
SI9 9UG
0753 888 447

MEASURED PERFORMANCE

This is a carefully tailored amplifier. The fact that it is bandwidth limited on CD and phono inputs alone shows it has not been designed wholly in Japan, since the Japanese get sloppy on important matters like this. This amp hits 20kHz - just - then output dies away. In fact, it starts to fall within the audio band, which is a bit risky, reaching -1dB at 20kHz. I'd expect some warmth in the sound as a result, but the treble is likely to be clean.

Careful attention has been paid to low frequency extension too. On CD the '350 reaches down to 8Hz (-1dB), just low enough to strongly reproduce the clean sub-sonics that exist on some CDs. Via LP (phono), however, output has been rolled off higher up, below 30Hz to attenuate warp signals and lessen cone flap. Again, this sort of thing is rare on Japanese amplifiers, even if it is within the IEC time-constant specification for disc stages. Warp filters make LP bass sound tight, but often detectably just a trifle light.

Power output was a substantial 84watts into eight ohms and there was plenty of reserve for lower loads, 132watts being

delivered into four ohms. Distortion levels were very low at all frequencies, remaining below 0.01% even when delivering full output at 10kHz, a stiff test.

The disc stage was well engineered in all areas, being sensitive, quiet and resistant to overload. As a cartridge load it acts as 47kΩ with 220pF in parallel, values that are correct for most moving magnet cartridges.

The PMA-350II has been very carefully

specified in all areas to meet a particular design philosophy. It should sound clean and powerful as a result; it may well possess some magic. Only listening can tell. It certainly is very thoughtfully engineered. **NK**

TEST RESULTS

Power	84watts
CD/tuner/aux.	
Frequency response	8Hz-23kHz
Separation	71dB
Noise	-96dB
Distortion	0.007%
Sensitivity	180mV
dc offset	2/2mV
Disc (MM)	
Frequency response	28Hz-20kHz
Separation	65dB
Noise	77dB
Distortion	0.008%
Sensitivity	3mV
Overload	170mV

Distortion



The PMA-350II has very low distortion.



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In very many ways an optical link appears to be the ideal solution for joining two pieces of digital audio equipment together. Obviously a link which has no electrical contact cannot introduce ground-loop interconnection problems, short-circuits or crosstalk. Also, because the bandwidth of an optical link is so high, it would appear from a superficial inspection that an optical link would provide the very fastest (and therefore "cleanest") signal path possible and that it would introduce the least distortion into the digital audio waveform.

No doubt these considerations account for the adoption of the optical digital interface being included on many pieces of consumer digital audio equipment in favour of the apparently simpler coaxial electrical interface. (My own DAT recorder and CD player included!)

Yet all is not right with the consumer optical digital audio interface, the TOSLink" style link popular in consumer equipment is widely regarded as sounding a little less crisp than its coaxial, electrical

"smearing" of the digital audio pulses in the time-domain resulting in an effect known as modal dispersion. Such smearing of the digital audio data can cause a degree of timing instability in the positions of the data transitions (jitter) and this can effect sound quality. One can conclude that a cheap optical interface may actually provide a poorer transmission channel than its simpler electrical brother.

The only advantage such a link can have over its coaxial counterpart is its freedom from ground-path induced

interference signals such as hum and r.f. noise. Yet at digital audio frequencies such ground isolation, if it is indeed necessary, is probably much better bought with a transformer. But strict adherence to the IEC 958 Type 2 interface standard for the



double-insulated equipment, earth-loops have all but vanished - or should I say all been silenced? (To digress a little, I have to say that the adoption of double-insulated equipment for audio use is, in my view, one of the greatest steps forward in the last twenty years of the manufacture of hi-fi equipment and it both baffles and irritates me to see how some "audiophile" manufacturers are returning to earthed-frame construction for their equipment.)

Fortunately, transformer coupling which is my favoured (though expensive)

recorded message

Left by Richard Brice

optical transmitter is exactly the same data-format, bit-for-bit, as that which needs to appear on the coaxial socket (ie. AES/EBU two channel serial digital audio bitstream with consumer use of channel status bits). The optical transmitters fitted to domestic equipment are driven by a TTL signal adhering to this data format. Suitably buffered and attenuated this TTL signal can be used to drive a coaxial socket on a suitably drilled and modified back panel. The complete modification I devised is shown in Fig. 1. I opted to leave the optical output connected.

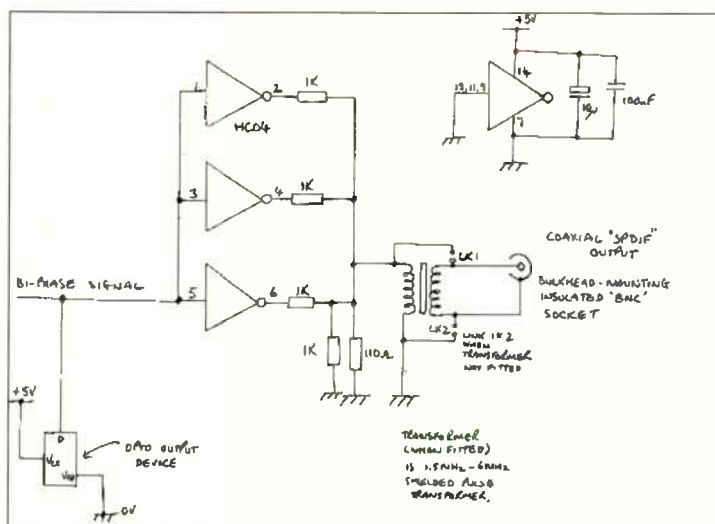
The circuit features a cunning use of the cheap and easily available high-speed CMOS hex inverter package HC04. I opted not to use a transformer since I have not experienced any ground-loop problems with modern double-insulated, mains-powered, digital audio equipment. Once there was a time when every hi-fi magazine you picked up contained a forlorn enquiry on the letters page from some enthusiast asking how was it possible to reduce hum from a turntable or tape source. Indeed this was a very real problem in days when nearly all hi-fi equipment was earthed.

However with the widespread adoption of Class 2,

approach to solving grounding problems in analogue audio is also available as a palliative in digital links and it is very much less expensive and bulky when implemented in a digital audio circuit. Nevertheless digital audio transformers aren't perfect and introduce group-delay distortions which are the corollary of modal dispersion in fibre-optic links so I decided not to use one.

The complete modification (which represents about a days work) result is an electrical interface on a insulated bulkhead style BNC socket next door to the optical output with a signal as clean as any I have ever seen on a coax interface. Indeed the signal proved to be so good it was used as a reference source when developing an outboard DAC. I have now completed this modification on a number of CD players and in every case it brings with it a worthwhile increase in sound quality.

The modification should prove relatively easy for anyone handy with a soldering iron and bold enough to delve into the guts of their hi-fi equipment. Do remember to earth the unused inputs of the HC04 package, failure to do this will lead to increased jitter. Remember too, never work on any equipment unless it is fully isolated from mains voltages and that any modifications may affect your warranty ●



counterpart. There are a number of possible reasons for this. They all concern the limited bandwidth of any cheap optical interface: In the first place the speed of the link is compromised by the relatively slow light emitting diode transmitter and photo-transistor receiver housed within the connector shells.

Secondly, cheap optical fibres, which allow the optical signal more than one direct path between receiver and transmitter (the correct term is multimodes), cause a

electrical coaxial link on domestic equipment requires the use of a transformer on the transmitting end in any case!

Sad indeed then is the man who like me had a CD and DAT player with digital outputs on optical connectors only. Sad enough to set about considering how it might be possible to modify my optical outputs to provide 75Ω coaxial outputs. Fortunately, the job is not as difficult as it seems because the signal which drives the "TOSLink"

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SYSTEMDEK IIX900 + RB300 + G1012	330.00

Are there parts of the music reproduction chain that we are completely ignoring - the vital links without which music wouldn't even exist? I'm not referring to musicians, recording engineers, or even the equipment that reproduces their work, but something even further down the chain. The ear and the brain are the final two parts of the chain that seem to be rarely discussed, but whose response to music can vary by a much greater degree than any pair of loudspeakers.

I think that it is only sensible that we know a little about how our ears work and what information they are receiving. Before I talk about the ears response, it is important to know what frequency relates to what instrument, or vocalist, so that you know, for example, that if

falls. It is important for faithful reproduction to reproduce these harmonics up at least as far as our ears can hear.

In Fig.1 you can see the various ranges that different instruments cover and what frequency they relate to. Below that I have reproduced frequency response curves for the ear at various ages for men and women. The graphs are plotted in dB, so to make it easy for you to gauge how much a, say 5dB loss would sound like, try this. Turn up your stereo and mark the position of the volume control. Now ask someone to very slowly turn the

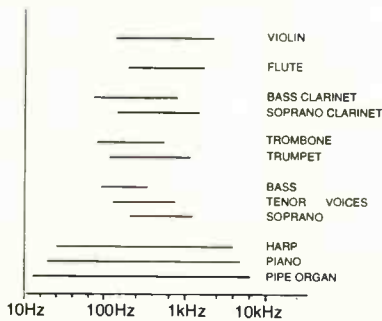


because the corrected response of the hi-fi might seem more attractive. Or alternatively they might just find it less real.

In the near future could we see the concept of hi-fi change? Maybe you will be able to walk into a shop, get a machine to measure hearing losses and compute compensation curves. The information could then be recorded onto a card that, when plugged into an amplifier instructs it to produce any necessary compensations a listener might need. We could even see devices that fit in or around the ear so that even at live concerts the sound is

Dominic Baker

dB on the level



the ear is deficient at 3kHz, you will lose the higher notes produced by a piccolo from the orchestra - not the boom from a bass drum!

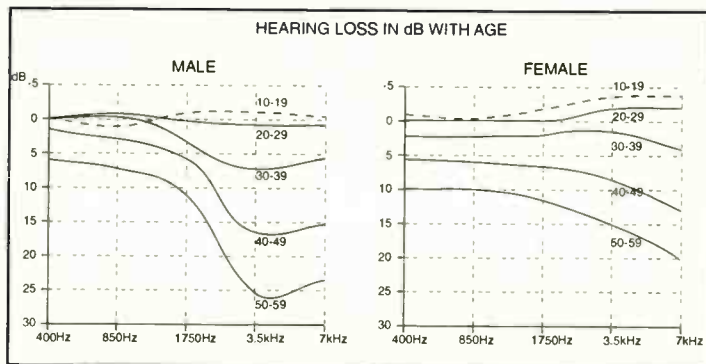
Neglecting electronically produced music, and concentrating on what I like to call 'real' instruments, music fundamentals cover a range of 16Hz to around 8kHz. So why are we bothered with ruler flat responses up to 20kHz, the normal upper limit set for hi-fidelity equipment? The answer is harmonics. Every note played on a musical instrument consists of a harmonic structure of many frequencies which gives each instrument its individual character. These harmonics are multiples of the fundamental frequency that an instrument produces, i.e. a violin playing a note having a fundamental frequency of 2kHz will have harmonics at 4kHz, 8kHz, 16kHz, 32kHz etc. As they go up in frequency the amplitude

volume down whilst you are listening, stopping them when you hear the level change. The smallest difference that you should be able to hear is about 1dB. So if you turn the volume down in a similar fashion, one audible

order to reproduce a live concert, your hi-fi must recreate all of the sounds at the same level as they were in the original. It doesn't matter what deficiencies that your ears may have, as long as the live event and the reproduced one have the same response.

equalised and we hear perfectly.

But should hi-fi be true to live music in an absolute sense or should electronic equalisation be used to iron out any hearing discrepancies? Which is the most accurate or just true high fidelity? We are possibly compensating for response age related hearing losses when we pick a pair of loudspeakers that have raised treble. Those who are sensitive to strong treble will likely pick a dull speaker. Perhaps this explains why some people will prefer a speaker with a response like a contour map of the Alps, rather than a flat response alternative.



step at a time, five of these steps will give you an idea of what a 5dB drop will sound like. The graphs may look a little frightening at first, but does it really matter if you have lost 5dB of your hearing across a certain range? It certainly appears that having hi-fi equipment with a ruler flat response is not much use to someone without perfect ears. But, in

However, it would easily be possible for manufacturers to fit filters to your amplifier that could compensate for any hearing losses that you experience with age, but there would then be a discontinuity between what you heard at a concert and what you heard when you got back home. In fact, some listeners may possibly prefer the hi-fi to a concert

Are we automatically compensating for our ears with our choice of equipment? I think we are to some extent. The ears and brain are complex in the way they work, but also highly variable between individuals, preprogrammed by experience and expectations and very sensitive too. They play an important part in our perception of sound quality ●

WIN THE MOREL

QUESTION FORM

1. How long have Morel been making drive units?

<input type="checkbox"/> 5 years	<input type="checkbox"/> 74 years
<input type="checkbox"/> 18 years	<input type="checkbox"/> 81 years

2. What is the total number of tweeter units found on both loudspeakers?

<input type="checkbox"/> 2	<input type="checkbox"/> 3
<input type="checkbox"/> 4	<input type="checkbox"/> 6

3. Where are Morel based?

<input type="checkbox"/> Huntingdon	<input type="checkbox"/> Salisbury
<input type="checkbox"/> Ipswich	<input type="checkbox"/> Folkestone

4. What type of voice coil can be found on these drive units?

<input type="checkbox"/> Super Ceramic	<input type="checkbox"/> Multi Magnitude
<input type="checkbox"/> Ultra Linear Bass Coil	<input type="checkbox"/> Hexatech

5. What is the approximate volume of Bassmaster's cabinet?

<input type="checkbox"/> 35 litres	<input type="checkbox"/> 12 litres
<input type="checkbox"/> 11 litres	<input type="checkbox"/> 22 litres

TIEBREAKER (obligatory):
Complete the following ditty in no more than THIRTY words.

I like music in the morning
 Even more at night
 I like a good bass presence
 With definition that's tight
 Perhaps Morel's new 'speaker

Name _____

Address _____

Postcode _____

Daytime Tel. No _____

Evening Tel. No _____

The Competition prize on offer this month is a pair of Morel Bassmaster 602 loudspeakers, complete with matching stands. Although Morel may seem to be relative newcomers to loudspeaker manufacture, they, in fact, have eighteen years experience designing and producing quality loudspeaker drive units at their Ipswich base.

Morel's recent expansion from drive unit to full loudspeaker manufacture has resulted in the Bassmaster 602. As its name suggests, this new speaker aims to produce ample low frequency content, to act as a solid foundation to music. Morel has sought to achieve this goal without using multiple, or large-diameter drive units. They have adopted their own unique approach by designing drive units fitted with high powered magnets and large diameter Hexatech voice coils. These improve drive unit performance, whilst also allowing a more efficient crossover to be used.

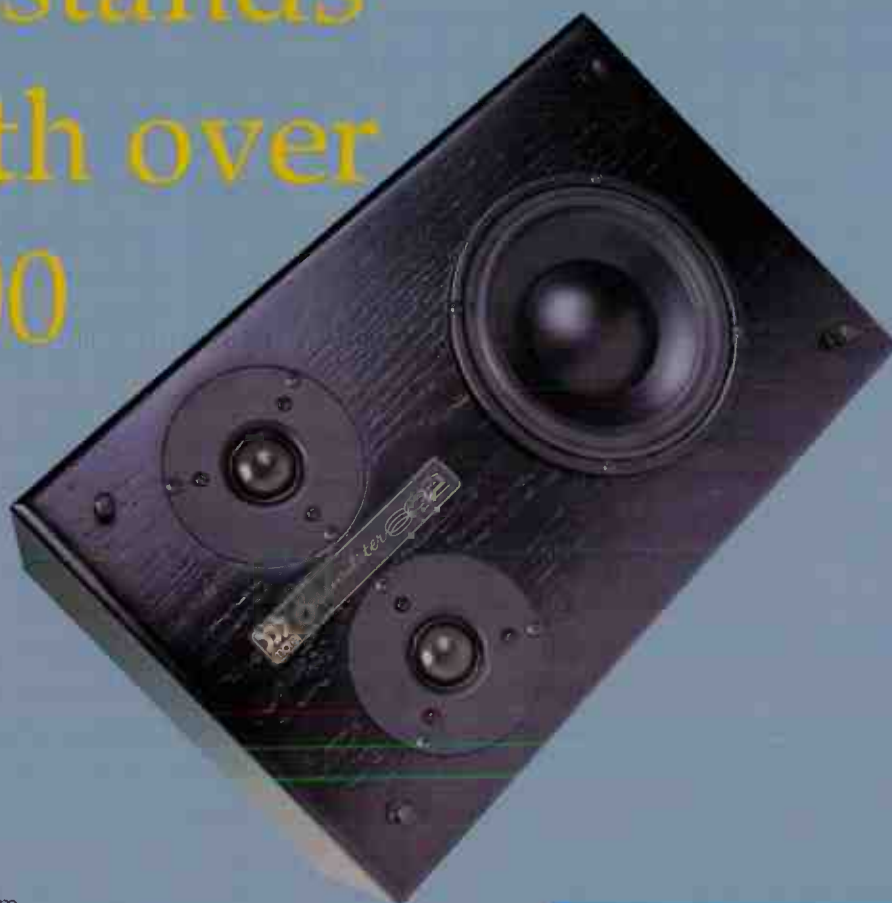
Although the speakers are a three way design, the '602 uses not one, but two tweeters. They sit alongside a lone reflex-loaded six and a half inch bass/mid range driver. The cabinets sit 'sideways' as opposed to vertically upon their dedicated stands and they are surprisingly small, measuring a mere 16" wide by 10" high by 9" deep, which gives the whole cabinet a modest volume of around eleven litres.

Once the '602s are set to work they quickly show that their name is deserved and that it's not just a product of wishful thinking. Reviewed in our March 1993 issue, we found the 602s produced an extraordinary sensation of strong, clear and firm bass for their size.

The Bassmasters not only reproduced bass faithfully, but they had certain 'Studio Monitor' qualities. Their recovery of detail was so strong they invited the listener to be transported back to the recording session.

The Bassmasters combine overall precision, bass tightness and tonal accuracy with excellent build quality. With stands they normally cost £1325. However, the lucky winner of our competition will experience the unique sonic experience of Morel's Bassmaster 602 for free!

BASSMASTER 602 LOUDSPEAKERS and stands worth over £1300



Please send your entry form, completed in block capitals, to arrive by 6th September 1993, to:

MOREL BASSMASTER
COMPETITION,
Hi Fi World Magazine,
64 Castellain Road,
London W9 1EX

In the event of more than one entrant submitting all the correct answers, the winner will be decided on the tiebreak. We will endeavour to publish the results in the November issue. Audio Publishing reserve the right to publish such entries or parts of entries as the company sees fit. We regret that photocopies or facsimiles of the entry form cannot be accepted. No correspondence about this competition will be entered into and the Editor's decision is Final. Employees of Morel Ltd. and Audio Publishing Ltd. may not enter.

HEYBROOK SEXTET WINNER

JUNE ISSUE COMPETITION

The lucky winner of our Heybrook Sextet Competition is Mr. H. G. Timmerington of Surrey. Heybrook have decided on "Integra" as the name for their new integrated amplifier coming later this year. Due to the number of entrants that picked this name the winner was picked out of a hat.

AUDION SILVER NIGHT DELIVERY MAY ISSUE COMPETITION

Peter Strickland, a headteacher from Tadworth in Surrey was delighted with the arrival of the Silver Night monoblock valve amplifiers. Both Peter and his wife were amazed with the extra detail this excellent amplifier resolved from their music.





Single minded about single-ended

Geoff Hill, chief design engineer at Goodmans Loudspeakers Ltd, talks to Noel Keywood about his unique DIY hi-fi system.

Why did you decide to build something as esoteric as a solid-state, single-ended amplifier? There are none in existence. What gave you the idea?

I had a Pye Mozart valve single-ended amplifier for years which I used to listen to when I was with the folks, using a pair of Stax electrostatic headphones. That system gave me an incredibly detailed and sweet sound, but the Mozart has problems. It can't drive real loudspeakers; it has no control over its bass and it's not really got any dynamic range. It's a very clever design but it is limited in what it can do. You need a special speaker for an amp like that.

I wanted an amp that doesn't really give a damn what you shove on the end of it, that has real bass and will reproduce the top end as well.

But these limitations could equally have convinced you that conventional push-pull was the answer.

No. I wanted an amp where I knew exactly what it would do. A single-ended design using a MOSFET means you can't get any crossover distortion at all, which means that all low level detail has got no

choice but to come through. I was more interested in getting together a design that could have as good a low level recovery as possible. You need efficient speakers, but with such speakers you can get more than adequate volume levels.



Geoff's single-ended Class A transistor amplifier which he designed himself.

What made you convinced that push-pull wasn't as good as single-ended?

It's not so much that it isn't as good, but it has a different set of compromises. If you are using a single-ended amp you can't have a lot of power available unless you are sinking kilowatts in wasted heat. This is impractical, which means you can't use inefficient speakers of say 80dB, so

your speakers have to be big. Big speakers tend to be efficient speakers and they have lower distortion, but they are physically bulky.

Paul Klipsch summed it up nicely: "if I've got a speaker that is 100% efficient it's got to be putting out everything that's going in". Most speakers are 0.01% efficient or less, which means that 99.99% of what's going in isn't coming out as sound.

That's an interesting way of seeing it. Alex Garner, Technical Director at Tannoy told us that efficient speakers have got more detail, their expensive studio monitors providing the example I believe.

It's fact that if you've got a big speaker with big cone areas, to produce any given level of input they don't have to move so far. Distortion comes from movement, so distortion is lessened. That's why horn speakers can work so well: you've got tiny drive unit movements distributed over a massive mouth area, so you are getting the high volume without running the thing hard, so you can use an amplifier that hasn't got massive power output simply because you don't need it.

Since 90dB is the level of a road drill - it is very very loud - if you get 96dB for one watt you'll be running any amplifier down in the milliwatts or tens of milliwatts region, where you'll get less distortion overall, even though there's more distortion on occasional peaks.

With a Class B or push-pull amp, you've got a point at low levels where the transfer curve changes from one device to another; you've got something changing right where you don't want it. You have to paper over the cracks with feedback.

Has your amp got any overall feedback?

Oh yes, to keep the output impedance down: it's about 35dB or so.

And the output devices - are they the popular Hitachis?

Yes. Provided you get them above the knee-point they are completely linear, which means they must be biased properly.

I'm told they are highly non-linear and need a lot of feedback.

If you are using them as a matched pair in a push-pull stage, then you've got difficulties. The input capacitance of the P channel device is a lot higher than the N channel device. So you have different time characteristics and you can't match the input impedances to the previous stage.

So, yes, used in push-pull you'll never get them matched together and that's the same with a bipolar device, where perfect mirror image pairs are not available for

push-pull working. Where you rely upon turning one device on and another off in perfect synchronism at all frequencies and levels there'll always be a problem.

I wanted to keep distortion down at low levels; I'm not worried about high levels. It is not meant to be for running a disco, it's a specialised hi-fi amplifier - and the two can be distinctly different.

How about the record deck? When did you buy that?

I bought it in 1986 or 87 - somewhere like that.

Why did you choose the Townshend Elite Rock?

I'd had a Linn for quite some time, but I got fed up with the thing drifting off. It wasn't stable; I was forever adjusting it. The Rock is stable and it does what it needs to do. I had a Linn for ten years with an Asak moving coil cartridge for a shorter time. I've got through quite a lot of cartridges, since I change them every eighteen months or so, because I listen to a lot of music. Their suspensions tend to go.

What did you design those Goodmans HIM440 loudspeakers for?

They were designed for the American market. A big speaker with good dynamics and power handling was needed. Unfortunately, they were

designed and built when the exchange rate changed and their price promptly doubled (1984).

So the UK never knew about these?

Well, yes, there were a few reviews.



Geoff Hill's Townshend Rock turntable with silicon fluid damping trough for the tonearm.

Were they big because the Americans demand big speakers?

They wanted high sensitivity as well, of around 98dB. The people we were up against were JBL and - especially - Cerwin Vega, both of whom make big, sensitive speakers, so the Americans have that expectation from their speakers. But they're quite accurate; measure them in the listening room with Mlssa (commonly pronounced Melisa, a speaker measuring system) and they'll come out flat.

You've got a solid-state head amp?

Yes, I designed it myself and it works from a car battery. It'll work for a couple of months before recharging is needed. There are no ICs (integrated circuits or silicon chips) inside; it uses only bipolar transistors. Nor are there any push-pull circuits. Everything is single-ended Class A. I used as few devices as possible.

What got you into audio?

Long ago I built an Everyday Electronics amp using AD161/162 germanium output transistors; it gave 5-10watts output. In my infinite wisdom I tried to uprate it to 50watts - it lasted microseconds before making a mess on the bench. That was my first indication of how difficult power amps could be and I was around twelve at the time.

And loudspeakers?

I have been building them since running the disco at school. I couldn't afford to buy much then, so I made it - and that included speakers. I studied electrical engineering and then worked for an electrical switchgear company in Brighton. Audio at that time was still a hobby. Then I joined B&W, just along the coast a little at Worthing, which is how I moved into hi-fi loudspeaker design. Finally, I moved even further West along the coast to Havant, near Portsmouth, to carry out design at Goodmans Loudspeakers.

IN THE OCTOBER ISSUE

PIONEER A-400X

One of Japan's best known 'British' amps has now been updated. By the time you get our October issue, Dominic Todd will have put it through its paces, and will tell all.

AMPLIFIERS GROUP TEST

If you're looking for an integrated amp between £400-500, this is the review for you. We'll be taking amps from a range of manufacturers and subjecting them to our usual rigorous analysis. What will make the most of your hard earned readies in this area of the market?

GOLDRING ELEKTRA CARTRIDGE

To ensure that vinyl is kept from becoming the preserve of rich playboys (and girls), Goldring have entered the fray with a budget cartridge, as covered in our News section this issue. Is this cartridge going to be a giant-killer?

PHILIPS LEGEND SPEAKERS

Smart new £200 speakers from the people who brought you DCC. They come with elegant and stylish stone effect front baffles, but do they look as good as they sound?

AUDIOLAB 8000DAC

A new £750 DAC-7 digital to analogue converter, pitched head-on against some sterling products from DPA and Pink Triangle. What can it throw at the competition?

AND OF COURSE -

THE SUPPLEMENT!

Yet another DIY supplement from our insomniac experts, who have been burning enough midnight oil to light a small town in their efforts to design and test the best in build-it-yourself audiophilia. There's also a list of suppliers of anything and everything you need to DIY to your system: book reviews, your very own DIY queries, letters, and a complete guide to the meaning and purpose of life, the universe, and everything (well, almost!).

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COMAG
MAGAZINE MARKETING

A recent leader in an electrical retailing trade magazine provoked me to write this month's column. In a nutshell, it claimed that the decline in sales of hi-fi separates is largely due to young people doing nothing else but playing video games. They are so addicted, we were told, as to be incapable of musical discrimination.

The writer neatly ignored the fact that a lot of adults like to play video games - especially on those hand-held gadgets. Just try prising one out of the hands of a 'grown up' trying to get a few more blocks in place on Tetris, or the next stage of SuperMarioland, for example. It's not a lifetime activity, there is room for other things like music: one can even listen to music at the same time (which is more than can be said of TV).

According to the esteemed organ, youngsters have lost the ability to enjoy music. It claimed that the sort of music they do listen to is all bass anyway, so quality reproduction is pointless. Buyers of quality hi-fi are now crusties who listen to classical and jazz - the sort of music which quality hi-fi can benefit, or so the journal says.

To cap it all, the one-make mini/midi and stack systems are now so good, this writer told us, that separates offer no improvement in any case! Customers may as well buy these from small independent retailers (presumably alongside the fridges and colour TVs) and not bother with separates. (If the retailers who read this tell their customers the same story, heaven help specialist hi-fi).

If all this were true, there would be virtually no youth market for cassette personal stereos, yet they are everywhere. Quite honestly, there are enough red flags waving here to enrage a herd of bulls. I plain saw red!

The whole daft argument is based on a list of false premises. Firstly, young people do not spend most of their waking hours playing video games. This is a popular misconception. They do like music. It may not be the same music which the writer of that leader column likes, but it is music to the listener. The dismissal of young people's music as being all bass and not of any real musical integrity sounds just like the criticisms of the music I liked when I was a teenager. Things turn full circle it seems, but I am more tolerant (if no more appreciative) of house, and rave than my parents generation were of the Rolling Stones and Cream et. al.

I have two teenage offspring

who buy recorded music - as do their friends, who play all sorts on small systems, (mainly, and ironically it would seem, inexpensive ones bought from high-street multiples. Some are 'into' the charts, others listen to the same oldies their parents like. Rave may seem like one monotonous beat to older ears (including mine), in the same way that rock and roll must have seemed a noisy racket to old-uns in the fifties, but followers of this scene actually like to hear how the tracks are mixed (quite a skill, I gather). High-power speakers with deep bass and a detailed sound are essential to aficionados. There are even those youngsters who - surprise, surprise - like classical and jazz,



Speaking Out

Dave Berriman voices his opinion

though they would never admit it to their peers.

So, the first and second parts of this fatuous argument could be put down to the generation gap. Video games have clearly not destroyed the younger generation's enjoyment of music. It is also erroneous to argue that any particular type of music is not worth reproducing well - just because the commentator does not like, understand or appreciate it.

The final comment that midi systems sound no worse than separates is quite inexcusable. We all know that a decent, well-chosen separates system will beat most one-manufacturer mid-priced sets up with ease. You don't need to be 'golden-eared' to hear the difference. The difficulty is that selecting and getting a demonstration of such a system means finding an experienced retailer with specialist knowledge.

The column in question was not directed at specialist hi-fi retailers, but at non-specialist electrical stores, which prefer to sell a branded system from one carton, without a demonstration, and hope never to see it again. The case for specialist hi-fi retailers would seem to be stronger than ever.

So why is specialist hi-fi in decline. Indeed is it in decline? Hi-fi is not so much in decline in the UK (and Europe and North America) as in hibernation. My personal view is that it has little to do with the advent of video games, the alleged paucity of good music, or even the price of CDs. (I remember LPs seeming so

expensive I could only expect to get one at Christmas or birthday time and to buy one for myself was a major event).

I think the reasons are two-fold. Firstly and mainly, there's simple economics. Hi-fi is viewed as a luxury item: when people are hard up, unemployed or worried about their jobs, they do not spend money on luxuries. It is as simple as that. The second is the view that specialist hi-fi is a bit like train-spotting: O.K. if you like that sort of thing, but not for the majority. This attitude is not new, however (remember the old Flanders and Swan ditty 'I never did care for the music much, it's the High Fidelity'?. No? Well, you're probably not old enough).

Another view is 'I wouldn't hear the difference, so it's not worth spending any more on better hi-fi. It's interesting that the very people who utter these words can hardly believe how good hi-fi can sound - when they bother to listen to it. All the advertising and promotion in the world cannot achieve the impact of the actual experience.

So, if hi-fi is in hibernation (and there are claims that specialist hi-fi sales are now growing slightly in the UK), what will encourage the few people left who spend money on luxuries, to buy hi-fi made by those little-known manufacturers who tend to produce the best sounding equipment.

Economics aside, it must be down to magazines to spread the word about quality hi-fi and specialist retailers to demonstrate it, because unless people know

there is such a thing and go and hear it, they are going to be blissfully unaware of its existence, or how good it can sound. If they visit non-specialist retailers, where hi-fi comes in just one carton, the staff are certainly not going to extol the virtues of separates. This attitude can only serve to help keep the sales (and expectations) of specialist hi-fi depressed.

The one really positive trend which the leader failed to mention is that personal cassette and, latterly, CD stereos have revolutionised music listening. Now music lovers can hear their favourites while on the move, or wherever they may be. A decent pair of headphones plugged into the better examples, especially the

CD-based ones, makes a sound which can be much more enjoyable than those highly-promoted one-manufacturer packages.

This should give the hi-fi unaware listener a hint of the sound quality which could be achieved at home in the living room. The trouble is, that even the best personal stereos are a lot cheaper than separates systems. Persuading people to part with the extra cash is not going to be easy, unless they hear good hi-fi and simply have to buy it to enjoy their music (whatever it may be) even more.

Hi-fi as a status symbol has never been so strong in the U.K. as it has been abroad, which is perhaps why British hi-fi has relied on sound quality rather than gimmicks to sell it. This is what continues to help it sell abroad (mainly in the emerging Far-Eastern economies).

One final irony is that, while it was the Far East - notably Japan - which popularised hi-fi in the West during the seventies (and certainly did no real harm to quality British manufacturers), it is the economically buoyant Far East, particularly Taiwan and even mainland China, which is helping to keep many Western quality hi-fi manufacturers afloat. If these markets collapse before the traditional home (UK) and mainland European markets pick up significantly, I shudder to think what will happen to many UK manufacturers - but it will have little to do with Super Nintendo or Rabba Shanks ●

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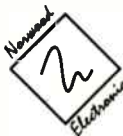
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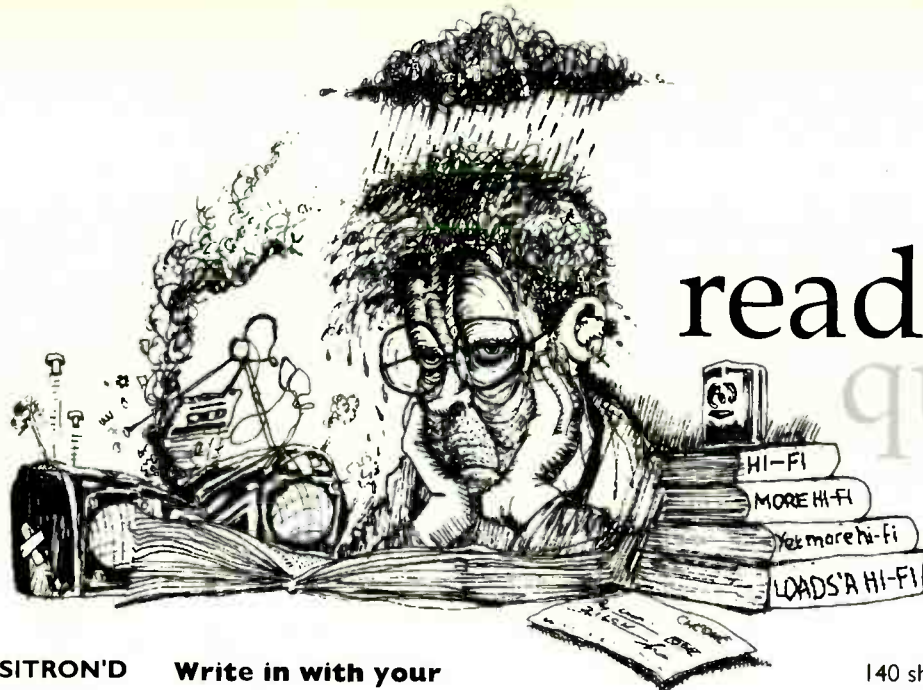
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readers' queries

GETTING POSITRON'D

My system at the moment comprises the Arcam Alpha CD player, Naim Nait 2, Arcam Alpha 3 tuner, Yamaha KX-360 cassette deck, Epos ES1 I loudspeakers, bi-wired with Linn K400. My musical tastes are mainly Motown, pop and light rock, singers like Tina Turner, Chris Rea, groups like Dire Straits, Simply Red.

I am thinking of adding a DAC to my system. I read with great interest your DIY article concerning the QED Digit. Would this be compatible with the Alpha and the type of music that I like, and are there any others you could recommend? There seems to be a lot of praise for the Audio Alchemy V10. I am also thinking of upgrading my amplifier.

I believe the Nait 2 can be converted to a pre amp. I was then thinking of adding the NAP 140 power amp, or would it be better to sell the Nait and purchase one of the pre-amps, or is there another combination that you could

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recommend?

The other option was to save myself some money and buy another integrated amp like the Exposure XX. The system is situated in a small room approx 12' by 12'.

**P Hallam
Gorleston,
Great Yarmouth.**

The option of moving to

Exposure is not wise. If you are happy with the sound of the Nait 2 then this is where you should stay. An inexpensive upgrade kit to turn the Nait into a pre-amp is available: contact Naim on 0722-332266. It will then run the NAP 140 power amplifier which will drive the Epos speakers with ease in your room. At a later date you could trade up to a NAC 72 pre-amp, or you may be able to find the recently discontinued NAC 62 available at a good price.

The QED Digit in twin-Positron form gives an unusually detailed and upfront presentation; it offers fine value and would suit your system well I believe. This is a modification worth trying. We suggest you contact QED for Positron power supplies and use our circuit info in the June 1993 Supplement to connect them up to a Digit. **NK**

I used Epos ES1 Is when evaluating the upgrades to the QED Digit. The detailed, powerful and forward sound of the Twin Positron Digit really helped the Epos speakers to display their strengths. I have also heard the Epos working extremely well with Naim amplifiers, although it was with a 42-5 and a NAP 250. I would strongly agree with Noel that you should upgrade to a separate power amplifier. The Epos are not an easy load to drive and I expect that your Nait is struggling. Upgrading to the more powerful NAP

140 should bring about greater control that will tighten up the bass and give a more detailed sound. **DB**

ALL ROUNDER

My set up currently consists of a NAD 3130 amp, an Aiwa AD-WX777 cassette player, a JVC JL-B44 turntable with Acoustic Research ARI 12 speakers and Monitor Audio 7 speakers.

My question is: I wish to upgrade at least one out of the two sets of speakers. Basically I'm hoping for a warmer sound with "bigger" speakers but retaining the surround-sound of four speakers. What speakers could you recommend and which of the ones would you recommend replacing?

Also, I'm considering a CD player. It wouldn't have to be full of facilities, preferably quite basic, but a random feature would be nice, but would this be a compromise for quality? Would you recommend anything particular?

**Laurence F Ring
London.**

Firstly, you need identical speakers all round for a reasonably cohesive sound. We'd suggest you try and change all your loudspeakers at once for good, modern budget designs. In particular, Mission 760is would give good results, but they may be a little dry in the bass for you. Tannoy 603s give more 'welly', but good sound quality. If you really want big bass then the bigger Tannoy loudspeakers - like 607 IIs - would be best, but they are a bit expensive for the rest of the equipment. Perhaps you



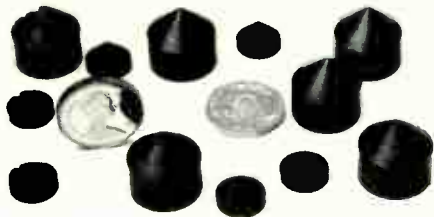
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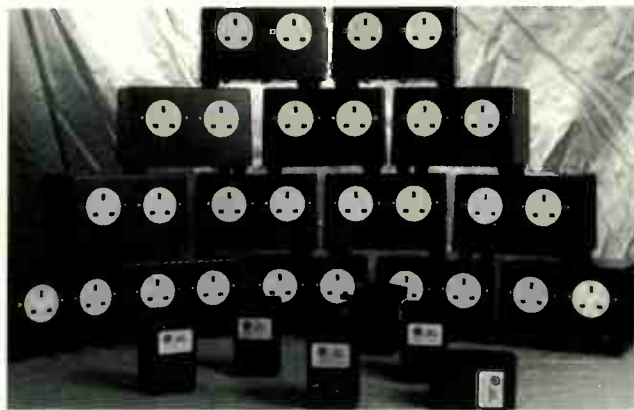
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Continued from page 65

really should be considering Cerwin Vega loudspeakers, which are big, inexpensive and have a lot of bass; pity about the subtlety though. **NK**

CASSETTE CRAZY

I am writing to ask your much valued advice on the decision to change from C.D. to cassette. This may well sound crazy, but recent experience of hearing a Nakamichi CR-7E deck has made me seriously consider this possibly rash move.

My current source is a Philips CD 930/QED DIGIT convertor combo, which sounds fine - BUT! It lacks the - how can I put it - relaxability of my father's Micro-Seiki turntable and Sony tape deck. Many pro-analogue journalists have said this "something" is hard to describe, and even "warm" isn't descriptive enough. The type of deck I could afford, if you thought that this move was wise, would be a Nakamichi DR2 - granted not quite a '7E, but I hope not that far removed.

The main problem I have with my proposed change is the life-span of cassettes. I would suggest that 30 years without serious audible degradation would be reasonable. If however you can assure me that there is no way that cassettes will last that long, then I will consign the idea to the bin.

On another note, may I say how much I enjoy your magazine. I started collecting it from No.6 and have only missed one issue since. The D.I.Y. supplements have been very helpful to this "kit-wrecker", as I have been nicknamed by various friends. I hope the flashy reminder that the mag is still only £2.00 is not a sign that the cover price is about to be hiked up! That's my cynical nature coming through.

On a lighter note, why don't you get all your analogue readers to send you their definition of the analogue sound. It could even be used as the basis of a competition, with the prize being a Goldmund Reference turntable! But then again, maybe not.

Can I take this opportunity to thank you all at HI-FI WORLD for the best hi-fi/music magazine on the market and wish you continued

success in the future. And keep that cover price for as long as you can!

**Euan Stuart
Ruthvenfield,
Perth.**

The good bits first - we've no intention at present of raising the cover price of Hi-Fi

grow disappointed with their sound and variability in comparison to CD if you rely on them alone.

It's too early to know whether Dolby S will take off and bring the cassette a new lease of life, but as yet Nakamichi don't have an S

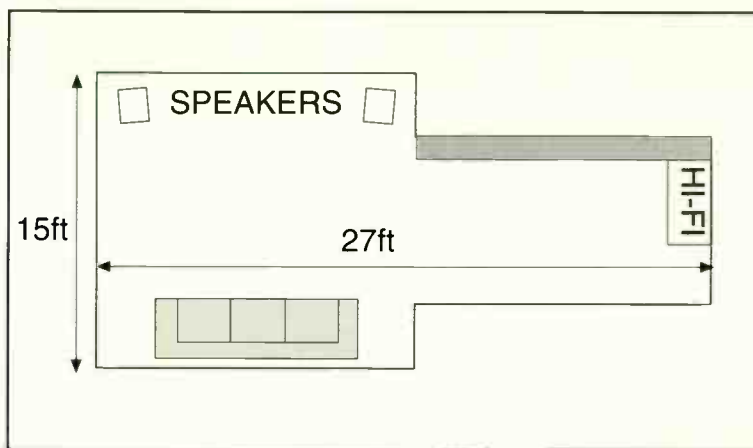
spend the £500?

I wonder about different 'speakers for a better sound stage and a cleaner sound. The cable I am using was suggested some ten years ago when reading Hi-Fi Answers which I read on a regular basis (single core from Tandy). The KEFs are on stands away from the walls.

All the hi-fi components from my system are housed on wall mounted shelves, once again following advice in "Answers".

The 'speakers are some twenty seven feet from the rest of my system. I listen to LP and CD equally, although the sound is better with the Rega.

**Mr B. D. J.
Baldock
Eltham,
London.**



Mr Baldock's room with the speakers placed about 15ft from the listening position.

World. The flashy bit was put there because we suddenly realised that most of the other mags had quietly gone up whilst we had remained at £2, our launch price set back in 1991. In spite of this, the mag has expanded and improved in that time to over 165 pages with the Supplement, making us larger than most of our competitors. It's something we're pleased about, so we'll keep to £2 as long as possible.

The not so good bit is that cassettes do suffer wear. I'm sure that they will last thirty years, but if played heavily the oxide surface coating wears and treble is lost; the sound gets gently duller, although not by much (-2dB). Print-through sets in progressively too unless a tape is continually used or wound.

In spite of these problems, surely the most important point to consider is sound quality. Whilst Nakamichis get the best out of tapes, pre-recordeds still remain inferior in quality to LP or CD. They're not usually sharp or nasty (some are, being equalised with treble lift to sound clearer on cheap recorders), but they're commonly a bit muddled, soft in the bass and crude sounding due to smeared treble, caused by tape overload at high frequencies (saturation). You will soon

recorder.

If you intend to record your own tapes, then sound quality with metals will be superb, but you will in effect be listening to source quality, namely your Philips 930/QED Digit combo. Recording at high-ish level onto ferric or chrome will soften things out due to mild saturation, but this is a degradation, even if it is aurally benign.

I suggest you listen to a Nakamichi with a selection of pre-recordeds first. I believe you might be better off trying to improve the sound from your CD system. Listen to a Pink Triangle Ordinal convertor with the ultra-smooth eighteen-bit filter installed and take a good look at the rest of the chain. It might just be that your amp and 'speakers are not helping matters by being harsh sounding in themselves.

NK

CLEAN STAGE

Please can you advise. My system consists of an Audiolab 8000 II new purchase, KEF 104AB very old (fifteen years), Rega Planar 3, P77 cartridge, Aiwa AD-F550 tape deck, Marantz 65 II CD player and a Rotel 84 tuner.

I now have £500 to upgrade my system. Can you advise me on the best way to

There's something of a dearth of good loudspeakers in this price region, but the new Tannoy 605-11s may well suit, since they offer good clarity and yet have enough power handling to fill your room. They'll also conveniently leave plenty of change for other



The Epos ES11s can sound fantastic in the right room.

components. In particular, your cartridge could do with upgrading, a Goldring 1022GX being suitable for the Rega. Other loudspeakers to try are the Epos ES11s, which seem to sing in smaller rooms but can sound tubby or even bloated in their bass in larger

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ones, so try a demo first. You may also like KEF Q60s, but they're a lot different from the 104ABs you have, having a livelier and punchier sound. **NK**

STICKING WITH VINYL

My system at present is an LP12/Lingo/Ekos/K9 with Trampolin, Creek 4140 S2 and Linn Index II speakers. I also have a Marantz CD50SE for a small, but growing CD collection. I will soon be in a



The Linn LP12, a good reason for sticking with vinyl.

position to substantially upgrade the system, and would appreciate your opinions. My thinking is as follows.

Since I have a reasonable vinyl collection and still prefer the sound of vinyl, I intend to build a top class system based around the LP12, and upgrade the CD player at a later stage. To give flexibility for future amplifier upgrades based on a digital front end, I feel it is best to go for separate phono/line/power stages, as pre-amps are concentrating more on line inputs, with few phono stages or none at all. The upgrade would then consist of a good MC cartridge, phono/line/power amps and speakers. The LP12 will have to go on a shelf, so advice on this would be useful as well.

The listening room is small (11 x 11), and I like a smooth, lucid sound with plenty of detail, especially on female vocals. The speakers will be either side of a chimney-breast, with alcoves about 12" deep behind them.

I've just about decided on a Lyra Lydian, although your

comments on the Linn Klyde would be appreciated. Contenders for amplification are LFD MC1/LS2/PA2 and Michell Iso/Argo/stereo Alecto (standard versions with Hera power supplies).

I'm open to suggestions for speakers although I've been impressed by Linn Keilidh's in an all-Linn system. Are these sensible combinations, or do you have alternatives I should listen to for a similar outlay?

Andrew Lowry Ipswich.

There's not so much we would suggest, since your choices seem sensible. The Lyra Lydian is a moving coil cartridge loved by all who hear it. Similarly, the Michell Iso/Argo and Stereo Alecto are amongst the best solid state amps available. Here though you should, if possible, listen to the new DPA amplifiers, the DSP200S and DPA200S, which are superb value.

If you like the Keilidh, use it as a comparative reference when judging other speakers. The one I'd suggest you try is the Heybrook Quartet. **NK**

FOOT TAPPER

I have recently upgraded my system, changing my NAD CD player and KEF 104/2's for an Arcam Delta 170.3 with QED digit and Positron and Quad ESL 63s.

The rest of my system consists of Quad 606 and QED passive pre amp with QED Incon Gold interconnects, QED digital interconnect and Furukawa

speaker cable.

My room is 30' x 14' with carpeted solid floor, and is quite "hard" apart from heavy curtains across each end.

I am enjoying the much greater detail and separation that I can now hear on my favourite recordings, but I find that many familiar tunes no longer set my toe tapping as they used to. Also, I sometimes find the treble a little too strident.

I intend gradually upgrading my system with a new DAC and amplifier, pre-amp and sub-woofers, not necessarily in that order.

How should I go about restoring the tunefulness of the music without losing the new found detail?

My current shortlist for consideration consists of: Pink Triangle Da Capo or Audio Synthesis DSM Ultra Analogue, Michell Argo and Alectos and Gradient SW63s.

Bryan Ansell Guernsey.

I have some strong reservations and some queries about your observations.

Firstly, going from KEF 104/2s to Quad ESL 63s is a major change and it sounds like you aren't really happy at the lack of impactful bass from the 63s, since foot tapping is usually associated with a well defined and clearly presented beat, an area where the 63s are weak. It has been said that bass drifts out from them - and I wouldn't disagree. Whilst we are all ardent

Quad electrostatic fans (that is - Eric Braithwaite, Dominic Baker, Richard Kelly and myself, Noel Keywood), we love them for their insight, cohesive nature and sheer neutrality; box loudspeakers really are

coloured in comparison.

What to do? Firstly, experiment with room positioning. Quads are dipoles that radiate equally from front and rear and they react with a room in a manner that differs from monopoles (i.e. box speakers). Peter Walker, founder of Quad and their designer, always used to look for a long demo room at hi-fi shows, he once told me. The 'statics would be placed one-third to one-half the way up the side walls, using wall and floor to effectively increase baffle area and improve bass. Ideally, the rear radiation should be allowed to dissipate itself by travelling a long way to the rear wall, before being returned by reflection. Since wave energy falls off as an inverse square of distance, moving the speakers to a position at least 3-4ft in front of your rear wall can have a big effect. Richard Kelly has no shortage of bass from his original '57s and he places them like this in a long room similar to yours.

I use Celestion SL6000 sub-woofers, having designed my own crossovers to match them to the ESL63s. However, I have also used the REL active sub-woofer and can vouch for its effectiveness with the Quads; they form an astonishing combination together. The Gradients we don't know, but we have heard differing reports about their abilities. Again, room dependency may have

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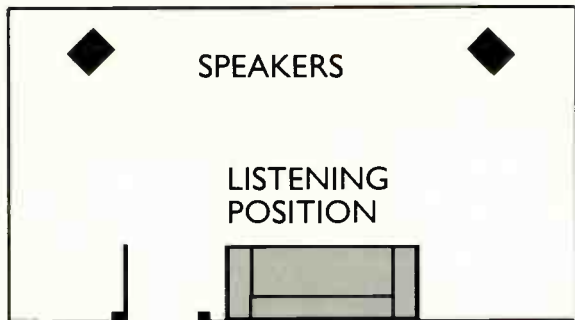
The Quad ESL63s are a favourite amongst us at Hi-Fi

Continued from page 69

something to do with this, something the REL unit seems immune to.

I'm surprised that the treble should sound strident. I can only assume that the Digit and Positron have something to do with it, since although the Digit on its own is very smooth and mild mannered, it gains zest with the Positron.

But zest isn't stridency. Try to be quite certain that you are not just hearing much more of the nastiness of CD as a medium through your new set up. If this is the case, then further improvement may only make matters worse, if you see what I mean! Also, make sure you are not trying to wring too much volume out of the 63s, since they'll only go so far and no further. I'd advise 12-15ft as a typical listening distance. If you are 20ft away in your long room, then you may be over driving them to get



Mr Davies' room is 23' long and 13' wide with a suspended wooden floor.

enough volume.

If you are at all tweaky and don't have inquisitive young children to worry about, then removing the protective louvred metal grills of the 63s (an easy task) will make a big improvement and will get rid of a slightly hard sounding metallic colouration from the upper mid-range. The electrodes have 2,500volts on them, so watch out!

Whilst the replacement items you list are superb in their own right and will work well with your system, I would hesitate to say that they could, alone, provide what you are seeking. More fundamental adjustments need to be made I suspect and, if

you remain unhappy, then it may just be the case that the Quads, as wonderful as they are, don't suit your expectations and requirements and may well be needed to be replaced. Even though we all happen to think they are incomparable in many areas, they are not everybody's cup of tea. **NK**

WESTREX RESURRECTION

I need your advice. My system is as follows; a Systemdek II X turntable with Akito arm/K5 cartridge, Marantz CD-42 compact disc player, Akai GX95II cassette deck, Pioneer F-91 tuner and Rotel RC/RB 850 amplifier all mounted on heavy duty wall shelves. The speakers are Westrex and the listening room is 23' long by 13' wide with suspended wooden floor.

The problem is, I'm not sure the system is performing as well as it might. You see the speakers have only recently

symptom of crossover problems?

Also an internal inspection revealed no soundproofing whatsoever. Could this have been by design? If not, what material would you recommend I install.

Also is there any specialist servicing available for these speakers? They are a 15 ohm impedance two-way design with 15" woofer vented at the top of the front baffle and a 4" metal dome tweeter. I have no handbook for them but have been told that they are rated at 30 watts. They are also large, extremely heavy and mounted on short dedicated stands.

Would a change of amplifier improve things? And as it's impractical to take the speakers to a dealer's listening room, it will have to be 'buy it and try it' - do you have any suggestions? My budget is around £600, but it might be more if the sound quality merits it.

The Garrard 301 is now mounted in a heavy teak plinth awaiting a new tone arm and cartridge, any suggestions here?

Would it be better to re-think the entire system? And given a budget of £2000 where might it be most usefully spent?

Musical taste is mainly light classical and easy listening male and female vocals.

I would greatly appreciate your suggestions and comments.

**John Davies
Saudi Arabia.**

PS The listening room is in my UK home which I use to the full when not at my working address here in Saudi Arabia.

You have a lot of interesting options available. The Systemdek IIX and Akito are fine, but the K5 is not much appreciated in these regions.

It is too hard, bright, and edgy in its sound, even as budget cartridges go. We'd recommend a cartridge upgrade to a Goldring 1012GX or a 1022GX, both



Goldring's 1006, 1012GX and 1022GX moving magnet cartridges (left to right).

of which give a warmer and more amenable sound than the K5, whilst retaining detail.

But what about that 301? Since Japan will pay a fortune for a good sample and the Japanese have already bought just about every good sample not consigned to skips by unknowing Brits, you can be assured it is worth careful attention. Contact Terry O'Sullivan of Loricraft (0488-72267), Peter Soper of Slate Audio (0525-384174) or Hayden Boardman of Audio Classics (0942-57525) for info on this classic. A Garrard 301 in good condition (they can be renovated) and mounted on a solid plinth (various new designs are now available) offers a superb performance. However, your current record deck is pretty good too, so don't throw that away instead! I suggest you get both running and choose the best, since idler drive on a solid plinth (301) gives a different sound to belt drive on a suspended plinth (Systemdek). The Garrard is nowadays commonly paired with a modern SME arm for top results, but you could also use a Rega RB300, which is excellent value.

I'm afraid you are unlikely to ever find that rich, warm sound again until you return to valves - and even then not all modern valve amps possess such a sound. Renovated Leak and Quad valve amplifiers are available

(try Station Sounds 0903-239980, Haden Boardman, G.T. Audio 0895-833099 or John Petrie-Baker of Clear Crystal Systems 071-3289275). Sweet sounding modern valve amplifiers are available from Art Audio, Audio Innovations and Audio Note, to name but a few.

If the sound you once heard and liked so much came from your Westrex speakers, then perhaps you should keep them. However, most old loudspeakers do show their age sonically and you could well consider replacements. Rogers or Snell loudspeakers are worth auditioning, or Heybrook Quartets. **NK**

LOCKWOOD AUDIO SAY -

I would guess that your reader has either a smaller Westrex (Western Electric) enclosure, or similar units in an independently made enclosure. I have some experience of the Acoustilens, but not of smaller enclosures. So far as I know, Westrex cabinets were not damped, a philosophy carried forward to some recent models (Epos, etc), but being made of very heavy plywood they were by no means lively. The crossovers were massive and complicated affairs which could probably be replaced with something much simpler (and higher grade!).

As to the sound quality obtainable they are hard to beat with contemporaneous (late 1950s) valve amplification and should give stunning results with modern valve set-ups of relatively modest power.

Repairs to the LF unit are possible, but probably not with the original cone. The crossover should, as I suggested, be re-built; the 20/90 HF was, I believe, virtually indestructible, although your reader may, from his description have a different HF unit.

Roger Francis Lockwood Audio.

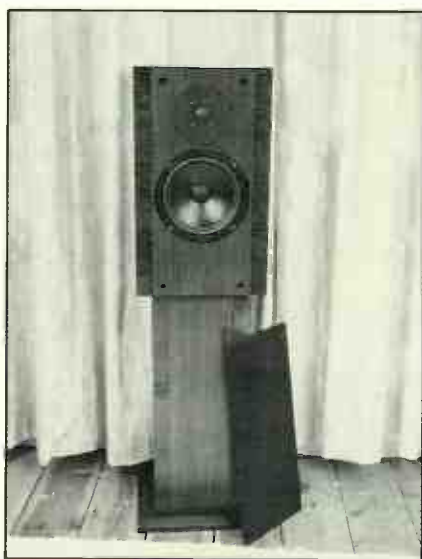
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POWER AND DETAIL

Your magazine has always been very good, but the DIY Supplement gave it reference status. I hope you will continue with it.

Concerning the twin power supply for the QED Digit, I



Heybrook's Quartets work extremely well with low powered valve amplifiers.

would like to know whether its performance could be improved when using two accumulators (e.g. 12V batteries for motorbikes) instead of the two Positrons. If this were the case, then it could be a nice project to design a unit for automatic recharge.

I also would like some advice on my way to hi-fi nirvana. My system currently comprises a Marantz CD 80 CD player, Audio Synthesis passive pre-amp and two Moth 30 mono power amplifiers firing a pair of B&W Matrix 3 Series 1 speakers (6 years old). The binding posts of the speakers have been removed and the power amps are now directly connected to the crossover.

Interconnects between the pre and power amp are Einstein cables and between the CD player and the preamp Monster Interlink CD. The speakers are spiked and the rest of the system rests on Sorbothane feet. Room size is 3.20 X 4.50m. The CD player has been tweaked with the result of smoothing its harsh

treble. The sound of the system is really good, but I would like to hear more detail and make the presentation more powerful. I think I should add a DAC using the Marantz as a transport. My short list: QED Digit with twin power supply, Orelle CD 180, Pink Triangle Ordinal and Audiolab 8000 DAC. Later I would like to buy new speakers.

I would be very happy if you could show me some alternative ways of improving my system.

**Dieter Strecker
Konrad Adenauer Platz,
Bonn.**

Of course we will continue with the DIY Supplements. Our current plan is to continue producing one every other month, the only break in this schedule being for the Feb '94 issue which is written around Christmas time. There will be a two month gap here, Noel and I have to rest at some point!

It certainly would be possible to use batteries and in fact this, with care, is likely to produce even better results than two Positron power supplies. However, for simplicity, and to allow a clear upgrade path from the standard Digit, we chose not to do this. Maybe if there is enough interest we will provide a suitable circuit and charger for a battery power supply.

If you want more punch and drive from your system I would suggest going for either the QED digit with twin

forward midrange with plenty of attack and detail.

One other way of improving your system, you have already half attempted. To gain more control and power try removing the crossovers from your speakers completely and placing them on the floor next to the foot of your stands. Move the power amplifiers onto the floor as well, ensuring that they still have good ventilation around them, and wire the output terminals with as short a piece of wire as possible to the crossover. Then take the bass and treble wires from the crossover directly to the loudspeaker drive units.

Making the speaker leads shorter will improve the grip that the amplifier will have on the loudspeakers. Most pre-amps will have no trouble driving long interconnects, but as you are using a Passion I would recommend no more than, say, 2.5m of high quality, low capacitance cable. I find that DPAs Black Slink works extremely well with most passives.

Removing the crossover from the loudspeaker and connecting it directly to the power amplifier has two advantages. Firstly any mechanical vibration that may upset the fairly sensitive components of the crossover is removed and secondly the amplifier drives the crossover directly, from which point onwards the bass and treble signal wires to the loudspeakers are kept



The twin Positron'd Digit featured in our June '93 Supplement.

Positron, or something like the Micromega Duo. Funnily enough, they both use the same DAC chip, Philip's SAA7323 which, when correctly applied, seems to possess a coherent and

completely separate. Its like one step forwards from bi-wiring.

I hope you try these little tweaks. If so, I would be very interested to hear how you get on with your system. **DB**

The Music Pages

Malcolm Steward checks out some classic Sixties Soul and contemporary Texan Blues . . . whilst Giovanni Dadomo gets his hands on the long awaited new release from U2.

Malcolm Steward



Curious, isn't it, how record companies want to sell more product yet they've not twigged that compilations - of any description - aren't the way to do it. I would aver that you could only persuade fervent completists to duplicate material they already own by buying rehashes. Top prize for gall, however, must surely go to the exec who instigated the release of Arrested Development's Unplugged album - hell, they've only made one album!

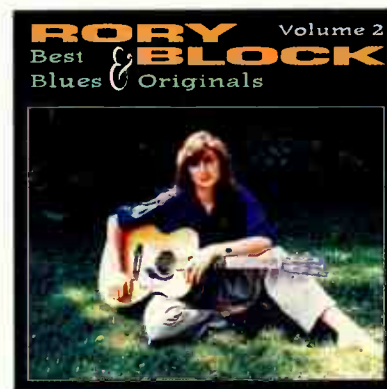
Anyway, assuming that you're not a completist, you like Neil Young, and you don't have Harvest Moon, Unplugged could be seen as a worthwhile buy. I'm actually a sucker for his wheezing harmonica playing and the fragility of his voice when it's not being bolstered by amplified accompaniments. I also have to admit thinking that he's a sublime songwriter and I particularly like his old material - songs such as The Old Laughing Lady, Long May You Run, and The Needle And The Damage Done, some of which date from the sixties.

I enjoyed this album, but suspect I might not have done had I paid for it.

NEIL YOUNG Unplugged REPRISE 9362-453 10-2

● Call me cynical but I'm not exactly sure why they've released this album. Perhaps I've not quite grasped the concept of the 'unplugged' series but I thought that the idea was that you took a performer who normally plays electric instruments, or who is usually backed by an electric band, and recorded them playing their electrically arranged songs with acoustic instruments. Wasn't Mr Young's last album, Harvest Moon, predominantly acoustic? Okay, there were electric instruments in the mix but it wasn't exactly a garage grunge album like Weld, now was it?

I've mentioned Harvest Moon because its closing track, Natural Beauty, was a live acoustic recording - just like 'Unplugged', and other tracks from it - Unknown Legend, From Hank To Hendrix, and Harvest Moon - all appear on 'Unplugged'. Can I be forgiven for thinking that this is starting to sound like the familiar Best of... formula, but with a slight twist?



RORY BLOCK Best Blues and Originals Volume 2 MUNICH RECORDS NETCD 0043

● Disregard - temporarily - what I said about compilation albums elsewhere this month. There's a good reason why I'm preparing to do an about-face. Some artists' earlier material isn't as easy to get hold of as others and when that's the case I'll make exceptions to my don't-buy-

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CLASSICAL76

Peter Herring

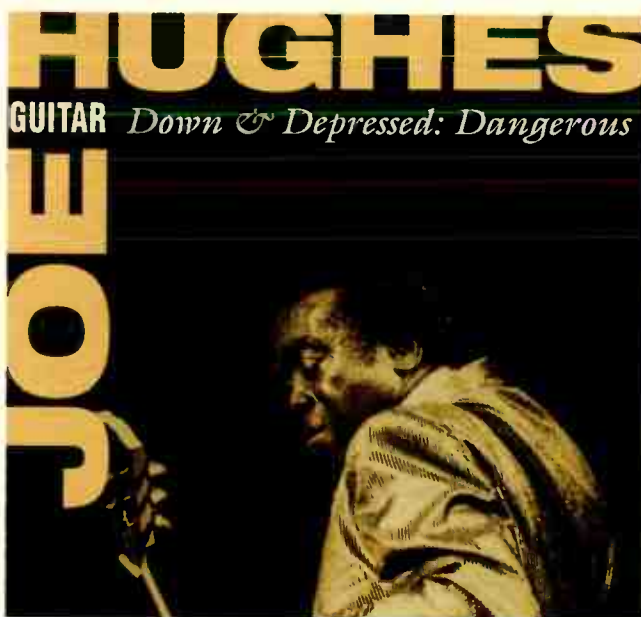
JAZZ86

Simon Hopkins

RECORD MAIL ORDER97

RECORD OF THE MONTH

**JOE "GUITAR"
HUGHES**
**Down &
Depressed:
Dangerous**
MUNICH RECORDS
(THROUGH TOPIC IN UK)
NETCD 0044



● Just when you imagined that you couldn't find one more blues guitarist-singer who could really make you sit up and take notice, along comes another plucker with a style that marks him out as something special. My most recent finds have all been players from the mid-West but Joe "Guitar" Hughes comes from way down South in Houston, Texas. Perhaps it was the fresh-aired flavour of his playing that first made me sit up and listen when his CD whirred into action. Having lived on a diet of over-driven Strats and big, rich-sounding semi-solid 335s that typically waft out of the mid-West it could have been the surprise of hearing his clean-as-a-whistle Les Paul tones. But I think it was more than that.

I'm sure it was Joe's whole

approach to the guitar and the animated, dance-floor bop of his backing players that really caught my attention. This outfit runs on economy fuel; there's not a superfluous note in any of the fourteen songs that make up this album. Joe makes every single note count. He has a touch that's fluid and easy-going but notes fly out of that Les Paul as though the Devil himself was chasing them. Adding noticeably to the music's punch are

drummer David Lartigue and bass player Tanya Richardson. I'm really taken with the latter, whose bad-ass style on up-tempo tracks really makes its presence felt - check out her playing on Big Boss Man. This album is stuffed full of good-time material - despite what its title intimates. Even if you're not a hard-core blues fan, you'll appreciate its gestalt. Contemporary Texan blues has a more cosmopolitan feel than its urban relatives and there's variety aplenty if you're not happy to sit through an hour or so of twelve-bar. Fans of the latter won't be disappointed but even when he's in full blown traditional vein, Joe Hughes' personality pervades his playing. Try Pitbull, and Put The Crack Down for two very different examples of the everyday backbone of the blues being enlivened with some Lone Star verve.

compilations rule. On that note, if you have trouble finding a copy of this disc, talk to Special Delivery (Topic Records), who distribute Network CDs in the UK.

Along with the first Best Blues and Originals CD, this twenty-three track CD will provide you with all the material that made up Rory Block's first four LPs for Rounder Records, recorded between 1981 and 1986. If you've bought and enjoyed her more recent recordings you'll be pleased to find that this earlier material sits very comfortably alongside them.

Resolutely acoustic and firmly rooted in America's rural tradition, this album draws on the range of musical influences, including Delta blues and gospel, that have shaped her own writing and performing styles. You'll notice how well her own songs stand among her versions of classics.

Her voice is strong, emotive and wide-ranging throughout, making a fitting accompaniment for her guitar playing, which never falls below the standard of spell-bindingly communicative and powerful. I realise it's a hopelessly sexist comment, but her playing has a decisiveness and forcefulness that you'd normally attribute to a male player. It's not just

the sound she wrests from the guitar, it's the determination that drives each note and phrase that astounds me when I hear her play. Check out tracks such as the country-tinged No Place Like Home: those bass string patterns come from a right hand that means serious business. Then listen to the dexterity and finesse with which she works her way through Robert Johnson's Kind Hearted Man, where you'll witness sensitivity and power meeting head-on. As a friend once remarked after hearing her play, I'd give both arms to be able to play guitar like that! Listen to this album and you'll better appreciate the kind of brain-addling artistry that prompts an intelligent person to issue a statement like that.

THE ISLEY BROTHERS
Twist & Shout
SUNDAZED SC6002

● Wearing my boring old fart hat, I'll admit that I've rarely enjoyed anything that has been proffered as soul music since the seventies disco boom took all the soul out of it. Sorry, but for me soul music is still Sam and Dave, Wilson Pickett, Otis Redding, Aretha Franklin and, of course, James Brown.

Don't blame my views on nostalgia: I simply think of that era's music as real soul music because it had feeling appropriate to its name. The artists sounded fired up, as though there was something inside them compelling them to explode into song - something more spiritual and emotional than the thought of wearing designer clothes while riding in a limo to collect their pay cheques.

The same was true of the guys playing back-up to those vocal groups and singers. They also had - or sounded like they had - the same sort of motivation. Those horn sections, drummers, bass players and guitarists

knew how to hit you with a lick or riff that smacked you squarely in the monkey bone. You can keep today's sequencers, keyboards - unless it's a Hammond B3 - and Digital Wind

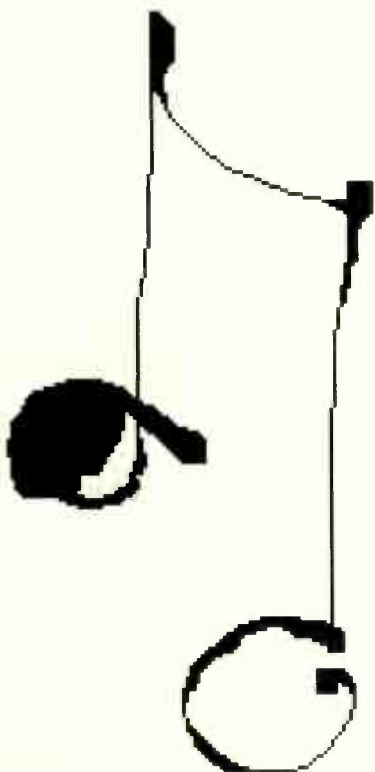


Instruments. Give me The Barkays, Steve Cropper, The Famous Flames... They had soul. Real soul, not the cardboard cut-out, comes-on-a-microchip stuff.

Recordings from that era had soul too. They weren't sanitised, super-slick, note-perfect, digitally noise-free confections; they were raw, rough and ready. They weren't always musically perfect nor were they technically state-of-the-art, but they worked in spite of that. Recordings like this, sixties' material from The Isleys, part of the Yesterdazed series from Sundazed Music Inc., are a great example. Listen to Twist and Shout before the Fab Four bleached all the colour out of it. Investigate Hold On Baby and hear where John Paul George'n'Ringo discovered those ascending harmonies. Or check out The Snake to hear an antecedent of the cool-man soul-jazz that scats out of the stereos in countless upwardly mobile living rooms. If lovey-dovey soul is more your brand new bag, try Time After Time to hear what sentimental songs can sound like without the agonising vocal histrionics that characterise the genre nowadays.

Okay, I'll grant that there are some oh-so familiar threads running through the music on this disc. Melodic invention, for instance, ain't its strong point. You'll come across one or two highly similar phrases popping up, in barely disguised form, in different songs but, hey, nothing's perfect. Take solace in the fact that the Isleys really could sing - there are some blinding performances here and the brothers frequently demonstrate impressive versatility. These guys definitely weren't stuck in just one vocal groove.

At its worst this is an interesting historical document. At its best it cooks.



Giovanni Dadomo

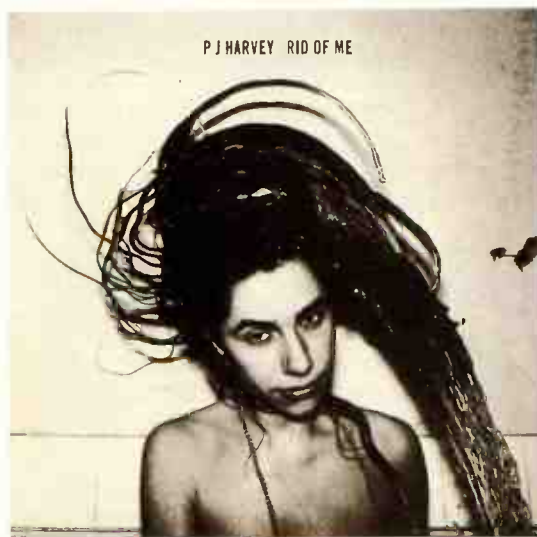
Rock + Pop.

PJ HARVEY Rid Of Me

ISLAND CD 8002/514-696-2

● PJ Harvey and her band made a big splash last year with their live concerts and the release of their indie LP, 'Dry'. This is her inevitable big label debut,

powerful contrasts and stunning lessons in how to take the old formula of guitar/ bass/ drums and make it sound as fresh and strong as if it were born yesterday. It was all there on 'Dry'; in fact it's all there on Harvey's demos - which, not surprisingly, Island are planning to release later in the year. But with Albini's brilliantly understated production (there seem to be virtually no overdubs, no evident use of studio trickery) Harvey has produced her best work yet - a definite LP of the year. And one we'll still be playing years from now.



Take the opening 'Rid of Me'; it begins with a deceptively simple rhythmic stutter of guitar (one of Harvey's favourite intros; it appears again and again in her work) and builds to a

positively atomic chorus. And the typically ambivalent and provocative Harvey lyrics: one moment she's passively pleading "lick my legs and I've desire / lick my legs and I'm on fire", the next she's dictating: "I'll make you lick my injuries / I'll twist your head off, see?" - and all done with a vocal range and control that's constantly astonishing and inspiring. This too is a technique she elaborates on often in her songs: on 'Legs' (there are lots of legs and blood in PJ's dictionary) where she tells a lover "I might as well be dead / or I could kill you instead"; and best of all on 'Me Jane', which has the brilliant verse: "Won't you move over Tarzan / can't you see I'm bleeding / Me I'm Jane / and I'm trying / to make sense of your screaming".

Clearly this is the sort of powerful poetry that only a woman could write, the sort that graduate theses on the sex wars are built on. And all this tied to a vast cauldron of sound as powerful as the best of the best at their best: The Stooges, Patti Smith Group, The Who, Husker Du, Ministry, et al.

And when PJ does stray from the

recorded in the States with monster producer Steve Albini (Big Black and other legendary combos), and it more than confirms all that initial brouhaha. It's no exaggeration to say that PJ's arrival was as momentous as that of Patti Smith or Chrissie Hynde in their day. She's that striking and original a performer, just as imaginative, just as powerful.

And no, I'm not being deliberately sexist, because PJ's femaleness is by no means coincidental, it's at the very bedrock of her appeal; it's at the core of her lyrical concerns; it's one of the most - if not the most - vital and provocative aspects of her entire musical and visual persona.

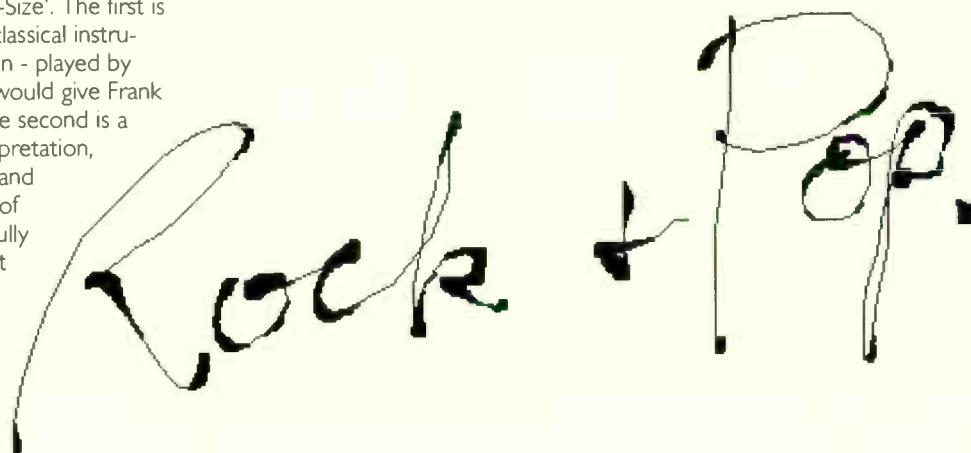
And only a woman could sing the way PJ does - she can ooze sensuality one second, and harper anger the next...and so on; everything about her has what the Cramps called the smell of female.

But that's just part of the Big Picture. There's the music made when Harvey's guitar gets together with the bass of Steven Vaughan, and the drums of Robert Ellis - a frugal, simple but hugely striking sound, full of

And when PJ does stray from the

classic format it's shocking. There are two versions of 'Man-Size'. The first is a bizarre mixture of classical instrumentation (cello, violin - played by Harvey herself) that would give Frank Zappa nightmares, the second is a thundering rock interpretation, all sharp percussions and thundering bass and, of course, that wonderfully minimal, roaring beast that is PJ's guitar.

Is there anyone around to touch this woman and her band? Precious few. A must.



U2
Zooropa
CIDU 29 518 047 - 2

● In pop as in all art forms there are two kinds of classics. There are the critical and aesthetic milestones, namely 'Smiley Smile' by the Beach Boys; 'Exile On Main Street', 'Ziggy Stardust', Love's 'Forever Changes', the first Velvet Underground album, 'The Stooges'; Sonic Youth's 'Daydream Nation', and such like. But far and beyond these so-called benchmarks appreciated by the critics or intelligentsia, there are what can only be described as events. Albums such as 'Sgt Pepper', 'Tubular Bells', 'Dark Side Of The Moon' or say 'Brothers In Arms'. These are popular on a global scale, not only for a brief period after their release but on a broad, almost incalculably lasting level.

It's U2's tragedy, as well as perhaps their crowning glory, that they achieved precisely that with 'The Joshua Tree'. It was, in short, the apotheosis of a

progressively more glittering career, one which gave them platinum sales and a world wide audience. It took their attractively simple style - guitar, bass, drums, and Bono's uniquely emotive vocals - as far as this admirably restrained formula would allow.

Whether through boredom or the luxury such a vast popular and commercial success allows, U2's subsequent work, 'Achtung Baby', with its clever-clever Berlin based production c/o Daniel Lanois and Brian Eno, was a brave and often inspired attempt to break with the

tried and tested formula of the rockin' U2 most of the planet had come to know and love.

Similarly with this latest effort - a three producer - Flood, Eno, Edge - affair, U2 spend most of their time trying their damndest not to sound like the group millions know. Hence the general title track with its satire and salvo against Euro adspeak- Vorsprung durch Technik, Zanussi catchlines, and even the ancient Colgate 'ring of

tinkling chimes and bass / percussion which pays more than a passing tribute to the late, indisputably great Marc Bolan. "You're coming to me from outer space", declares Bono at one point. The Bopping Elf would have loved that bit, even if, alas and alack, it's too short and unresolved to compete with 'Jeepster' or 'Hot Love', say.

In sharp contrast, The Edge's single solo contribution, 'Numb', a dry (treated?) monotone that's all fluting keyboards, rice crispy synths and synth guitar, is a real highlight. It's this, along with the Johnny Cash fronted 'The Wanderer' (no relation to the Dion and the Belmonts classic) that stand out from the rest. I liked Cash's gloomy reflectiveness - "I went out walking / under an atomic sky", and typical Bono Catholic boy contradictions: "I went out walking / with a bible and a gun". Cash - part demonic man in black, part reformed sinner, all wrapped in his dry, laconic monotone - is a perfect adjunct to a song that Nick Cave in his



confidence' hype, all set to a dense blend of synths, mumbly vocal overlays and scathing wah-wah guitar courtesy of The Edge. U2 evidently don't rate the 'new' Europe - "...be a winner, eat to get slimmer". This is a million miles from the wild romanticism of U2's best known, most commercially successful work. And, yes, perhaps it does deliberately carry touches of the proto-techno early work of Ultravox and Co.

We're on more familiar U2 territory, "slow down child / let me untie your lace", on 'Babyface', albeit with the Bono Vox contrasted against

most extreme Bible Belt psycho phase would have eaten his worm-and-sin-filled heart out for.

'Dirty day', all boiling keyboards and hot rhythms, is a rare instance of Bono venting his old style vocal passions. No doubt his lyric was an inspirational catalyst here: "throw a rock in the air / you're bound to hit someone guilty". If that's not a Papist conceit then Ian Paisley is a Rabbi!

But overall this is U2 falling between two stools - pleasing themselves and catering to the converted - and sadly landing on neither one nor t'other.

Classical

Peter Herring

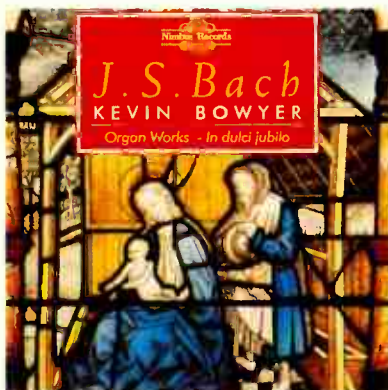
Bach at his most effervescent, Prokofiev at his most exuberant, Hindemith at his most elegiac, an ethereal setting of the Requiem from Renaissance Portugal and a rather more earthbound effort from one of Italy's greatest opera composers plus George Lloyd: eighty years young in June

JOHANN SEBASTIAN BACH
Organ Works - In dulci jubilo
 Kevin Bowyer, Organ
 NIMBUS NI 5289 (DDD/55.32)

● After lamenting the unimaginative programming of Martin Souter's Bach recital on Isis Records in last month's issue, it is heartening to report that the second volume of Kevin Bowyer's series for Nimbus is enticingly non-conservative in its choice of works. The recital is subtitled *In dulci jubilo* and the celebratory nature of this Christmas-tide sentiment is maintained throughout, and includes two chorale preludes on the old and, I'm sure, familiar theme of *In dulci jubilo*.

There is also a satisfying coherence and balance to the programme, which begins and ends with Bach at his most unbuttoned, in two exhilarating Preludes and Fugues. The concluding one, BWV532 in

the 'brilliant' key of D major, is technically and sonically dazzling, a most effective rebuttal of those who believe Bach's music to be unremittingly puffed. In contrast, the C Major Trio Sonata is more subtle, even suave in its thematic ideas, while the fine



selection of organ preludes chosen by Kevin Bowyer show Bach exploring and illuminating the German Lutheran organ liturgy, including that most famous of Martin Luther's own melodies, *Ein feste Burg ist unser Gott*.

As in the first volume on Nimbus, Kevin Bowyer once again has the benefits of a fine and appropriate instrument, and a warmly responsive acoustic, the Marcussen organ of the Sct Hans Church in Odense, Denmark. The sound is clear and precise, yet also vibrant and atmospheric and Bowyer sounds as though he thoroughly enjoys making music in this venue. Technically, he is first rate, but more important is the empathy he shows for Bach, especially the high-spirited, even boisterous character that emerges through much of this music, music which is entertainingly introduced by Wilfrid Mellers in his accompanying notes. No complaints about lack of imagination here!

GAETANO DONIZETTI
Requiem

Viorica Cortez, contralto; Luciano Pavarotti, tenor; Renato Bruson, baritone; Paolo Washington, bass; Orchestra and Chorus Ente Lirico Arena di Verona; conductor, Gerhard Fackler
 DECCA OVATION 425 043-2 (ADD/64.54)



● Like that other great Italian opera composer, Giuseppe Verdi, Donizetti also composed a setting of the Requiem Mass. And there, I'm afraid, the comparison ends. There are many fine moments in the work, some of which you feel must have impressed and influenced Verdi, and at times there are suggestions of the kind of sumptuous melodies which fill operas such as *L'Elisir d'amore* and *Lucia di Lammermoor*; but the invention is not sustained. In his defence, it has to be said that Donizetti, upon hearing of the untimely death of his compatriot and fellow composer, Vincenzo Bellini, merely wanted to write a simple lament in tribute.

It was his publisher, Ricordi, who persuaded him to expand this into a full-scale Requiem and then set a date in December 1835 for a memorial service to Bellini. The planning of the service was beset with problems and the Requiem - one of four settings that Donizetti made - was left incomplete (it lacks the Sanctus, Benedictus and Agnus Dei sequences).

The work was not performed at all during the composer's lifetime and it was 1870 before it was published, with the premiere coming that same year in Bergamo, where Donizetti had been a chorister. It has subsequently been revived to mark the centenaries of Donizetti's birth in 1897, and his death (1948), and its republication in the 1970s prompted this 1979 Decca recording in Verona, featuring - among others - Luciano Pavarotti. The mighty tenor makes the most of his big solo aria, *Ingemisco*, with its 'weeping' motif on violins and cellos, but generally this is an uninspiring performance, not helped by an uneven recording balance. Donizetti's Requiem is monumental and often dramatically coloured, using effects such as tremolo strings and shifting harmonies to the full; but Verdi it ain't.

PAUL HINDEMITH
Symphony in E flat/ Nobilissima Visione suite/ Neues Vom Tage overture
 BBC Philharmonic Orchestra; conductor, Yan Pascal Tortelier
 CHANDOS CHAN 9060 (DDD/59.32)



● The more I discover of Paul Hindemith's music, the more I like. The E flat symphony of 1940 is a first-rate piece, eloquent in its expression, taut in its construction. It follows classical procedures in terms of form and development and the use of counterpoint is almost pure Baroque, but the dissonant harmonic language is wholly individual. Hindemith began the work after his exile to the United States and could well have been motivated by hearing the splendid sound of the Boston Symphony Orchestra while he was lecturing at Tanglewood. The first performance, however, was given by another American ensemble, the Minneapolis Symphony Orchestra, under Dmitri Mitropoulos.

Hindemith had fallen foul of the Nazis soon after the party had come to power.

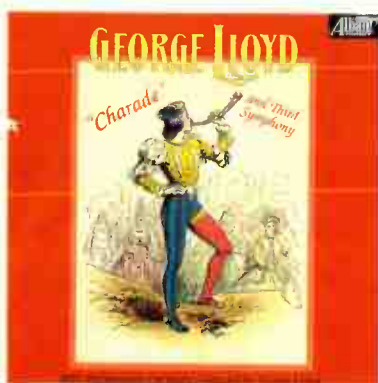
Classical

Goebbels denounced his comic opera *Neues vom Tage* (News of the Day) as obscene. It was an example of *Zeitoper* (opera of the time) which set out to deal with contemporary issues, in this case one which has no less relevance now - the power of the gutter press. Here, Yan Pascal Tortelier offers the concert version of the overture, a dazzlingly energetic piece full of jazz-derived syncopations and with an irresistible rhythmic drive. It also illuminates Hindemith's neo-classical leanings with its crisp counterpoint, and frugal textures.

By 1938, Hindemith was finding life in Germany intolerable. He was a patriot, but he could not accept what was being done in the name of his country. Before departing for exile, first in Switzerland then the USA, he wrote a work which extols the humanist spirit, and true human values, the ballet *Nobilissima Visione*. The inspiration for the work were the frescos by Giotto depicting the life of St Francis of Assisi to be found in the Church of Santa Croce in Florence. The suite from the ballet, performed here, is full of quite wonderful and inspiring music, reminiscent in some ways of those gloriously affirmative passages to be found in the symphonies of Carl Nielsen. And, like the other works here, it is compellingly played and directed with evident commitment by Tortelier. The spacious, full-blooded, yet detailed Chandos recording does full justice to the performances. A welcome and valuable addition to the catalogue.

GEORGE LLOYD

Symphony No3 in F/Charade
BBC Philharmonic Orchestra; conductor, George Lloyd
ALBANY RECORDS TROY 090 (DDD/
57.02)



● At one point in his career, George Lloyd was poised to consign the scores of his first three symphonies to the bonfire. Then he thought of all the renumbering of scores and orchestral parts he would have to undertake on his six later symphonies! Thus these early efforts were spared, the first two to be extensively revised, but the Third Symphony to remain largely unaltered. It is an engaging enough work but, in terms of depth of expression and

emotional impact, no match for, say, the powerful Fourth Symphony, arguably the finest of Lloyd's eleven symphonies.

Lloyd is at his best in the slower music, in the eloquent second subject of the opening movement, for example, a theme reminiscent of Rachmaninov and overflowing, as Lloyd describes it, "with minor key vigorous despair". An elegant slow movement is interrupted by a brass fanfare which introduces a lively, if not especially memorable finale.

The composer directed the first performance of this symphony in November 1935, with the BBC Symphony Orchestra and, here, it is another BBC ensemble - the Manchester-based Philharmonic - which supplies a spirited and enthusiastic performance.

The *Charade* suite (a title presumably inspired by William Walton's *Facade*) is a sequence of scenes inspired by events characteristic of the 'sixties: student power, flying saucers, LSD, marches, popular music and the like. Unlike Walton's *Facade*, however, there are no words involved, Lloyd relying entirely on his consummate skill as an orchestrator to depict the imagery. It is all wonderfully tongue-in-cheek, with adept use of many musical devices. The mock-serious 'academic' frugal writing of 'Student Power' is typical of its witty invention. Neither work here is from the top drawer, which is a pity when this Albany issue coincides with George Lloyd's eightieth birthday (on June 28), but both are persuasively performed and well recorded in the BBC's Manchester studios. And the *Charade* scenes, as well as being good fun, are an orchestral tour-de-force.

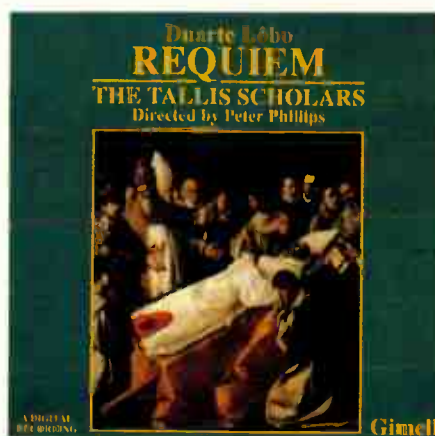
DUARTE LOBO

Requiem/ Missa Vox clamantis

The Tallis Scholars; director, Peter Phillips
GIMELL CDGIM 028 (DDD/65.48)

● The Portuguese composer, Duarte Lobo, was born around 1565 and died in Lisbon in 1646, dates which - as Peter Phillips points out in his booklet notes - place Lobo among those composers "on the cusp between a genuinely polyphonic Renaissance idiom and something based on harmonic movement reflecting

Baroque thought". Duarte Lobo (not to be confused with the Spaniard, Alonso Lobo) became the most revered and widely performed Portuguese composer of his generation but, tragically, much of his music was destroyed in the Lisbon earthquake of 1755. One of his teachers was Manuel Mendes and it is quite possible that Mendes introduced Lobo to the setting of the Requiem by Tomas Luis



de Victoria, which was published in 1605. If you are familiar with the Victoria Requiem, then echoes of its style will be heard in abundance in Lobo's beautiful setting for six voices. There is, however, a major difference: Lobo replaces Victoria's second soprano line with a second alto line (SAATTB) so producing a slightly darker, thicker sound. In spirit, too, the Lobo setting is akin to Victoria's, sharing its mood of tranquil repose, its air of celestial certainty. Simple, yet richly sonorous chords soar from the basic long-note plainchant; it is music of transcendental beauty, witness the exquisite *Agnus Dei* and the dissonances employed to great effect in the *Graduale*.

This setting of the Requiem, one of two made by Duarte Lobo (the other is for eight voices) was published in 1639. The same volume also saw the appearance of his Mass setting *Vox Clamantis*, a richly contrapuntal work displaying, like the Requiem, a good measure of originality. Both works find the Tallis Scholars in top form here, once again displaying the qualities of blend and tone for which they have become famous. This recording, made in the isolated church of St Peter and St Paul at Salle in Norfolk, also finds them at their most gloriously expressive. An essential addition to the collection for lovers of Renaissance polyphony.

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RECORD OF THE MONTH

The winter of 1945 and victory is at last within grasp in what the peoples of the Soviet Union know as the 'Great Patriotic War'. On January 13, the audience gathers in the Great Hall of the Moscow Conservatory to hear the first performance of Sergei Prokofiev's Fifth Symphony. What can it expect? An extravagant paean to the 'Great Leader' as Stalin and his apparatchiks would have wanted and probably expected? Or perhaps something that reflected the mood of those who had fought and suffered throughout the conflict.

The mood there was more one of pride tempered with relief, a despair at the cost of the war, in terms of lives lost and land destroyed, a simple desire for a return to normality, and a guarded optimism that victory might also bring change. This was the mood that Prokofiev reflected in his new symphony, a mixture of nobility, reflection and exuberance; much the same qualities were also captured by Shostakovich in his even more light-headed Ninth Symphony. Stalin had been let down by his two greatest composers; for his 'hymn to victory' (his victory, that is), he had to look to the dull time-servers among his court musicians.

Although the Fifth Symphony is wonderfully scored, Prokofiev eschews the virtuosic side that characterizes much of his music; there is also none of the irony and sarcasm that permeates many of his works. Yet the symphony is in no way humourless: for much of the time, it wears the broadest of smiles.

Prokofiev's response to the courage and endurance of his fellow Soviet citizens is made the more interesting because, in the 'twenties, he wanted no part in the cultural development of the post-revolution USSR. Eventually, however, this 'enfant terrible' mellowed upon discovering how much his music was still appreciated in his homeland. He returned from exile as disillusioned with western ideals as he had been with those of the Bolsheviks.

Much of that time in exile was spent in Paris and, as with almost every other composer of the period, he came into contact with

Diaghilev and his Ballets Russes, for whom Prokofiev's compatriot, Igor Stravinsky, had already written three memorable scores. Prokofiev approached Diaghilev with an idea for a ballet based on the legendary pre-Christian people, the Scythians. Diaghilev showed little interest in the idea, perhaps feeling it was merely repeating the pagan ritual embodied in the Rite of Spring. Prokofiev, however, was undeterred and welded the music into a concert suite. The dissonance of the music, its pounding, brutal rhythms, apparently so displeased some members of the orchestra that they gave up in disgust. The timpanist, though, seems to have thoroughly relished his all-important, high-profile role: he managed to break the drum skin in his enthusiasm.



SERGEI PROKOFIEV Symphony No.5 in B flat, Op.100/Scythian Suite (Ala and Lolli) Op.20

City of Birmingham Symphony Orchestra; conductor, Simon Rattle
EMI CLASSICS 7 54577 2 (DDD/64.02)

● First, a word of praise for the recording, which is of the highest standard. It was engineered by Mike Clements in the new (well, new-ish) Symphony Hall in Birmingham and is a model of balance and clarity, with natural perspectives and the kind of atmospheric but not over-cooked acoustic that makes for pleasurable listening. Indeed, the clarity is such that, for once, light floods into the more densely-scored sections of the Scythian Suite, revealing all the colour and detail that Prokofiev introduced into the orchestral texture. The playing in the Suite once again reveals

what a polished outfit the CBSO has become under Simon Rattle, though his interpretation of what is, in places, quite barbaric music is a little on the tame side compared to, say, Abbado on DG who pulls no punches here.

In the Fifth Symphony, however, Rattle offers one of the finest performances currently on record. The first movement is beautifully shaped and paced, the build-up to its mighty climax perfectly handled, so as to seem the inexorable consequence of the preceding bars. The spring-heeled scherzo is similarly well-pointed: vigorous, but light and joyful.

At the heart of this Olympian work lies an adagio of brooding lyricism which, in its minor key

central episode, rises to a climax of chilling anguish, embodied in searing harmonic clashes. Initially, Rattle seemed too deliberate, even ponderous in this movement but as the adagio takes shape, with its contrast of solemnity and serenity, so it becomes utterly compelling. The playing of the CBSO strings and woodwind is wholly admirable here.

As the Adagio subsides into peace, so the finale opens with recollections of the majestic first movement, but then a festive, carnival-like mood takes over and sweeps the music towards its rumbustious coda. Rattle

captures all the *jeux d'esprit* embodied in this music and brings the symphony to a rousing and invigorating close.

Overall, therefore, a performance of many virtues and barely a single vice. It doesn't have the sheer excitement of Mariss Jansons' recording on Chandos, with the Leningrad Philharmonic (as was), but there you have to accept Jansons' view of the Adagio as more a kind of intermezzo than the deeply-felt, highly-charged movement it surely is. Neeme Jarvi, also on Chandos, offers another persuasive account of the Fifth and the classic Karajan (DG) and Weller (Decca) accounts of 1969 and 1977 respectively still have much to offer. Given the quality of recording, though, and the desirability of the 'fill-up', I suspect Rattle and the CBSO have just about edged into the top spot with this work.



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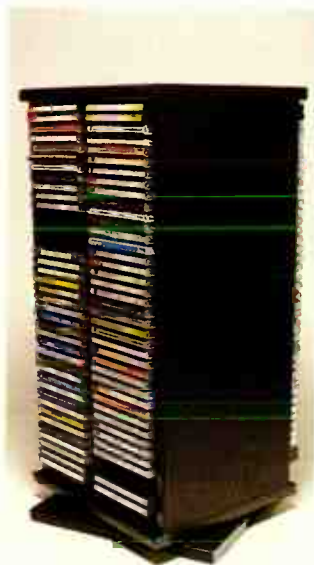
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Jan Garbarek's latest collaboration , a classic Bill Connors reissue and the late, great Hal Russell and his NRG ensemble all feature in this month's selection.

Simon Hopkins

ICE
Under The Skin
PATHOLOGICAL RECORDS

● After a regrettable absence of months, if not years, London's Pathological Records - the people who brought you gems from the likes

of Jap avant-metallers Zeni Geva, Free Jazz sax 'n' axe father-and-son team Peter and Caspar Brotzmann, high priestess of rage, poet Lydla Lunch, blasted, industrial sample-scapers Techno Animal and psychedelic-noise fetishists Terminal Cheesecake - make a welcome return to the fray.

'Under the Skin' is the debut (and only? let's hope not) outing from Ice, an ad hoc group of musicians brought together under the auspices of Patho prime-mover, vocalist and tenor saxophonist Kevin Martin, who co-incidentally fronts London industrial-improv collective God, reviewed elsewhere in this column. On this occasion, Mr Martin's colleagues include: fellow God-person, bassist Dave Cochrane; Alex Buess from Swiss Free Jazzers 16/17 on tenor saxophone; Jobaggy from the aforementioned Terminal Cheesecake on drums; and the extraordinary Justin Broadrick of Midlands-spawned gods of grindcore Godflesh - and Martin's collaborator in Techno Animal - on guitar.

In terms of music kicking around on the fringes of Industrial Rock this is a pretty stellar line-up, of course. But the music that makes up the nine songs of 'Under the Skin' far transcends any unintegrated supergroup piffle and, indeed, way outstrips the expectations of even these musicians' most fanatical devotees.

Starting with your basic extreme, bludgeoning drums-guitar-bass power trio, and working upwards, downwards and outwards, Ice bring the mixing-desk insanity of dub reggae, and Martin's free-jazz-as-noise aesthetic (Martin is by no means a 'technician' yet has the sheer force of a player who hears, indeed, feels the same power in the music of, say, Albert Ayler and PiL) into this psychotically disturbed music. Add to this layered, treated-beyond-recognition samples of classical and ethnic musics. Simmer.

The result, which recalls, but in no way resembles, said Ayler and PiL, and Killing Joke and Jah Shaka and Pharoah Sanders and even - most especially on the disc's hypnotic, relentless closer 'The Swimmer' - Can, is as hard to pin down in terms of genre and influences as it is immediate in terms of visceral impact, but is nonetheless, if perversely, one of the finest Free Jazz group records I've heard this year. Excoriating, mesmerizing and utterly essential.

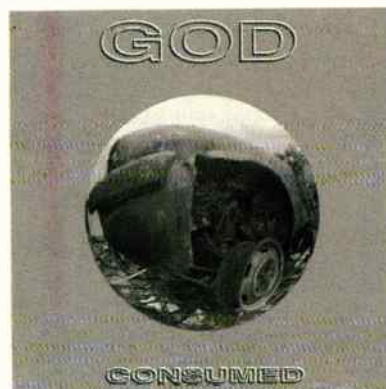
as much in terms of their free-floating-line-up modus operandi as their songwriting): Martin on heavily special effects-treated tenor saxophone and vocals; former Henry Cow alto saxophonist (and for that matter, one of the finest creative musicians this country has produced in the last quarter-century) Tim Hodgkinson; Simon Picard on tenor; Niko Wenner of San Franciscan hardcore-weirdness exponents Oxbow (for the record, creators of another fine Pathological release) on guitar - and slide guitar at that!; John Edwards on double bass; Gary Jeff and Cochrane on bass guitars; and Scott Kiehl and Lou Ciccotelli on drums. The album features four long workouts - two new pieces and two old (albeit renamed) - and the new pieces in particular point to great things to come.

Now for those of you sadly unacquainted with the chaps 'City Limits' described last year as this country's "most innovative band", use your imagination. Imagine the tribal onslaught of three bassists and two drummers; imagine Hodgkinson's and Picard's interlocked free improvising; imagine Martin's Wah-wahed, delayed, harmonized, squalling tenor inseparably caught up in Wenner's blistering guitar. And you still have no idea what this lot sound like. Utterly unique in Britain's musical landscape (and how many bands can you genuinely say *that* about these days), the target of ignorant, philistine rock press criticism as often as the recipients of the praise they earn in spades, and still, criminally, without a permanent recording contract, God remain the most important group on Europe's creative music scene. Buy this record. Buy the others if you haven't already done so. Luxuriate - albeit masochistically - in their sound. They are without parallel and ultimately superb.

THE HAL RUSSELL NRG ENSEMBLE
The Hal Russell Story
ECM 1498

● When the fine German ECM label eponymously released Hal Russell's solo, multi tracked, composed-improvised marathon 'Hal's Bells' last year, the irony that such a giant of Free Jazz was finally getting some richly deserved recognition just months after his death, was not lost on quite a few of us. For over twenty years, the saxophonist and multi-instrumentalist had been making some of the most creative new jazz music coming out of either Europe or America, and much of it at the helm of his group the NRG Ensemble.

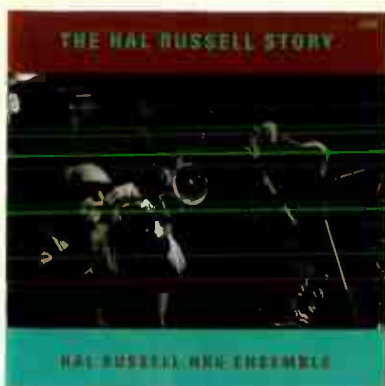
But Hal's story goes much further back than that. His career goes back



GOD
Consumed
SENTRAX SET 5CD

● And no sooner promised than with you, more from Messrs Martin and Cochrane in the person of God. The group's third album to date, following on from 1991's live 'Loco' and last years acclaimed, and quite staggering major-label debut (and, alas, swansong) 'Possession', 'Consumed' returns to the live album, and in the absence of an inevitably superior new studio album, will do very nicely for now.

'Consumed' captures the band live in Switzerland last year, and with one of the band's finest line-ups to date (the term 'collective' applies to God



to the fifties as a Gene Krupa and Buddy Rich-inspired swing drummer, and takes in, in his capacity as sideman, figures as diverse and as improbable as Miles Davis and Billie Holiday and John Coltrane. But the New Thing explosion in Free Jazz that came out of urban America in the 60s inspired Russell to take up saxophone, and then, just as altoist Omette Coleman took up violin to exorcise demons he couldn't work out on an instrument he could play so well - and so easily - Russell took up whatever instrument he could lay his hands on and make a convincing racket with.

Such multi-instrumentalism isn't just something he could put to use on a solo album like 'Hal's Bells', its a way of making music that he utterly believed in and passed on to sundry members of the NRG ensemble. Thus, the NRG group on 'The Hal Russell Story', though only a quintet (Russell; Brian Sansdstrom; Kent Kessler; Steve Hunt; and the extraordinary guitarist-saxophonist Mars Williams) manages to play saxes, trumpets, drums, tuned percussion, flutes, didgeridoo, toy horns, bells, electric guitar, double bass, trombone, vibes and on and on. With much ducking and diving, too. For not only do the band play this lot live, they record it without overdubs. Run boys, run! Halfway through the set, Russell asks: "What do you do when you know too much?" and the lads shout out in unison: "Improvise!" You'll look a long way before you find a finer exhortation to pick up an instrument and blow, bang, thrash. The punk-jazz ethic writ large.

Recorded just months before Hal's untimely death at a still-youthful 66, 'Story' features the man himself narrating a prose-poem about his remarkable life with the band illustrating the proceedings. And it's cracking stuff. The band romp through any number of styles - swing, Free Jazz, post-bop, even a riotous rendition of Fleetwood Mac's paean to the underdog 'Oh Well' - and blazingly. Other than Russell - on staggering form - Williams in particular deserves special mention; he blows some of the most ferocious saxophone this side of your old friend John Zorn

(apparently a big fan himself of Williams).

All in all, quite possibly the finest straight 'jazz' record of the 90s.

Coda: Russell's death is genuinely tragic, doubly so when one considers the music on this session. The good news is that the NRG ensemble have vowed to keep Russell's music alive, and will continue to tour and record. Here's to 'em, and to Hal, wherever he is.

MIROSLAV VITOUS AND JAN GARBAREK

Atmos
ECM 1475

Miroslav Vitous

ATMOS

Jan Garbarek

513391.2

● A couple of months after the Norwegian tenor and soprano saxophonist Jan Garbarek's somewhat disappointing group album 'Twelve Moons' comes his duet album with the Czech bassist Miroslav Vitous. Garbarek and Vitous played together on the former's 'Star' last year alongside drummer Peter Erskine. That session was a welcome return for long-standing Garbarek fans to the Omette Coleman - and even Albert Ayler-inspired freely improvised stuff of his earlier albums. 'Atmos' by comparison, is an altogether more rarefied, even pastoral session.

The album consists of nine pieces, all Vitous compositions - with the exception of the duet improvisations 'Time Out' Parts 1 & 2 - and the mood is definitely pretty sepulchral. In the past, Vitous has talked at length about the importance of letting sounds, just single notes, just hang in the air, and give off their full harmonic shape. And for much of 'Atmos' he's content to do just that. He also creates - and this is all live no overdubs stuff - percussion effects by beating against the body of the double bass, often quite intricately. And, of course, around these rhythms and sonorous bass lines Garbarek hangs his usual, wondrous stuff, by turns gentle, fragile even, and scorching.

The 'Time Out' pieces change the mood a little, with Vitous triggering orchestral samples from a midi pick-up. A recent review frowned on this, but this writer thinks it's the sort of touch that lightens proceedings a little

- I personally could have lived with a bit more of this sort of experimenting; listening to a straight sax-and-bass session hard on the heels of the multi-instrumentalist orgy of 'The Hal Russell Story' was a bit of a shock.

Over all, 'Atmos' doesn't exactly extend either player's repertoire much, if at all. Nonetheless, it is a bold statement, and given Garbarek's tendency to sublimate his soloing to ensemble needs on his own records, it's likely to be the biggest chunk of his playing you'll come by for some time. And away from all the bravado of so many bassist-leaders, Vitous remains one of the most ingenious and frequently rhapsodic double bassists currently working in jazz. A rewarding listen.

BILL CONNORS

Of Mist And Melting

ECM 1120

● Fifteen years earlier, Garbarek was making altogether different music, and in altogether different company. 'Of Mist and Melting' is a mid-period ECM classic from 1978, and one long overdue for CD reissue. The session was led by American guitarist Bill Connors, a mercurial figure who's gone from lyrical, extended-playing jazz sets like this to experimental, solo acoustic guitar settings, and then, in the mid 80s, metamorphosed into a hideous sub-Holdsworth fusion guitarist and swiftly disappeared without trace (I think). But his playing on 'Mist', and indeed, on the Garbarek group albums 'Photo With...' and 'Places', is among some of the most beautiful I know.

Connors and Garbarek are joined by the stunning rhythm section of bassist Gary Peacock and drummer Jack De Johnette, making this a pretty definitive ECM line-up; if the record label has a sound - and despite label protestations to the contrary, many contend that it does - then this group of virtuosic, thoughtful, ensemble-minded improvisers sum it up perfectly. A highly recommended CD reissue.



jazz

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SOMERSET

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MUSICAL APPROACH, Unit 7, Woodings Yard, Bailey Street, Stafford, Tel. 0785 55154. Also branch at 37 High Street, Aldridge, nr Walsall. Tel. 0922 57926. Arcam, Audiotech, Apollo, Celestion, Heybrook, Linn, Marantz, Rotel, Royd, Sennheiser, Target, single Speaker Dem rooms, free installation and credit facilities.

SUFFOLK

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Continued on next page ...

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YORKSHIRE (SOUTH)

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NORTH WALES

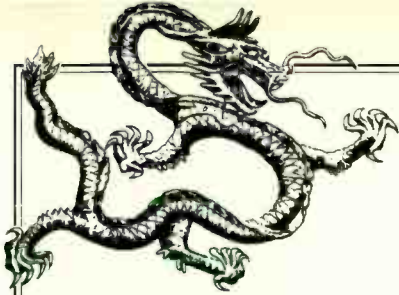
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*Denotes New Design for New Type

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We now have finished the design of a super high quality chassis for the line level pre-amplifier. It is constructed from heavy gauge steel with an aluminium anodised and polished front panel. This new chassis comes with the complete kit of parts necessary to build the valve line level pre-amp.

The components are all high quality and include a special screened toroidal transformer, Military Spec. Russian valves, Alps potentiometer, metal film resistors, polypropylene signal capacitors, silver plated copper wire etc. The price for this kit, including p&p, is £295.

K5881 KIT

Here's a superb new pure Class A twenty-watt DIY stereo power amplifier. It has been designed around the modern Russian Sovtek 5881 valve, their Military version of the highly regarded, but now obsolete American 6L6 beam tetrode. We've used super-quality output transformers designed, by Tim de Paravicini, to run these valves for super-low distortion. The input stage uses triode working and we have specified a rugged sixteen-gauge all-welded steel chassis.

Balanced and specified carefully for long life and reliability, coupled with excellent sound quality, K5881 is sensitive enough to be used with a passive pre-amplifier or our own line-drive pre-amp, and it matches modern loudspeakers well. We've equipped it with the best choke-regulated power supplies, one per channel, plus heavy 4mm 'speaker terminals that allow for bi-wiring.

This new valve amplifier costs just £395 as a kit of parts. An easy-build version with made-up circuit board and wired mains supply costs £495.



Power	20watts/ch.
Frequency response	16Hz-40kHz
Distortion	0.02%
Noise	-94dB
Sensitivity	220mV
Dimensions (mm)	400w,300d,180h

HIGH PERFORMANCE 3-WAY LOUDSPEAKER

Our high performance 3-way DIY loudspeaker featured in Supplement Nos. 3 & 4 is now available as a complete kit. Included in the kit are all drive units, crossover components and tag boards, precision engineered flat pack cabinet, wadding, hardware etc. The cabinet has been designed to be extremely easy to build (even though there are 36 panels for the pair) requiring only wood glue and stretchy carpet tape to clamp the panels in place.

When built, the loudspeaker is comparable to those costing more than twice the price, with a transparency and openness in the midrange that is unmatched by most. The price for this entire kit, including V.A.T. and p&p is £729.

Because some of the drive units in this kit are difficult to source we are offering a drive unit pack, which contains 2x Tonigen Ribbon tweeters, 2x MW-114S midrange units, 2x MW1075 Bass drivers, all crossover components, tag board and terminals. Price will be £420 inc p&p.

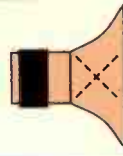
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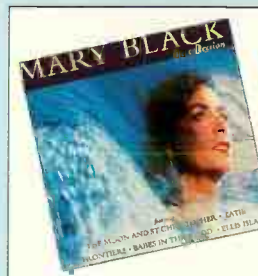
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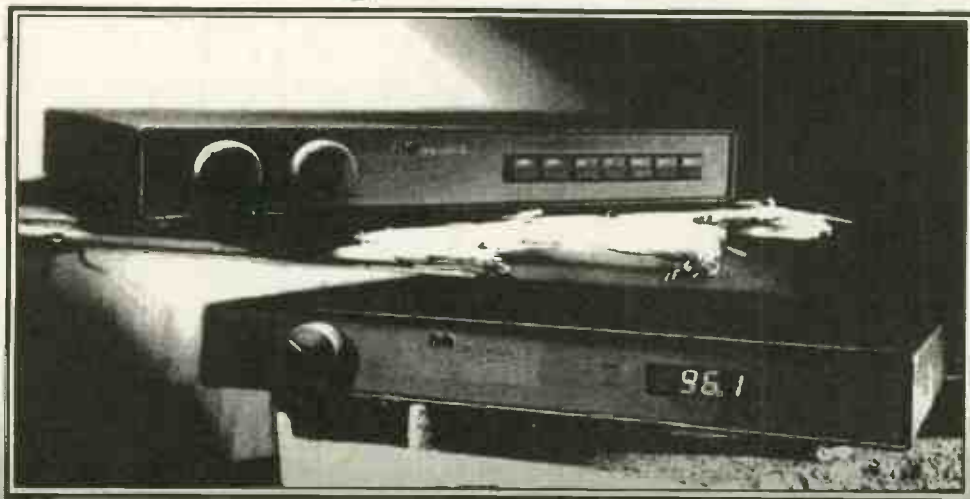


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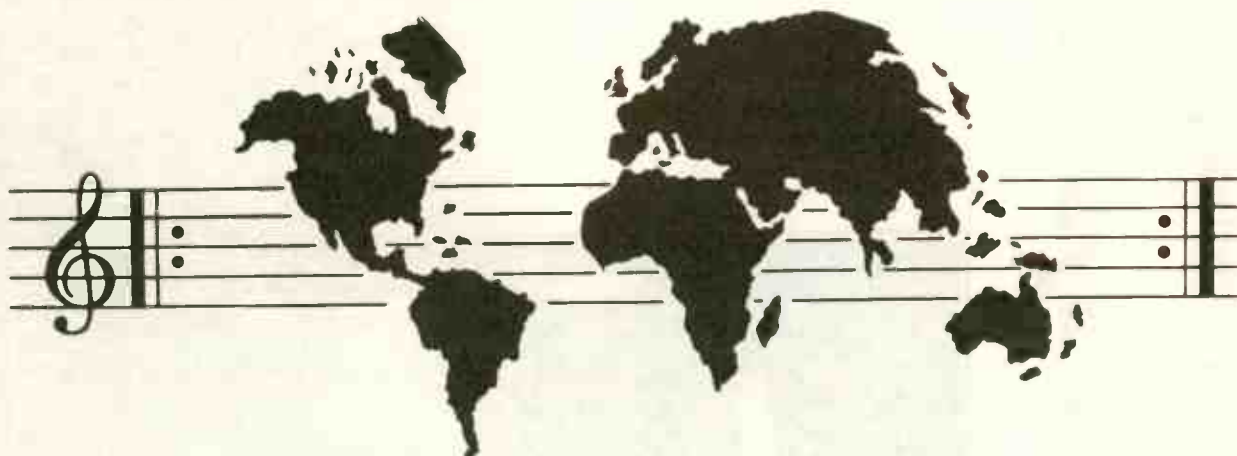
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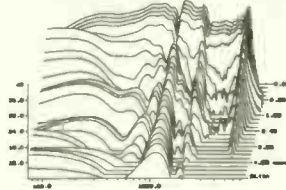
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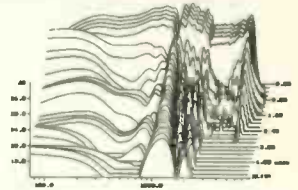
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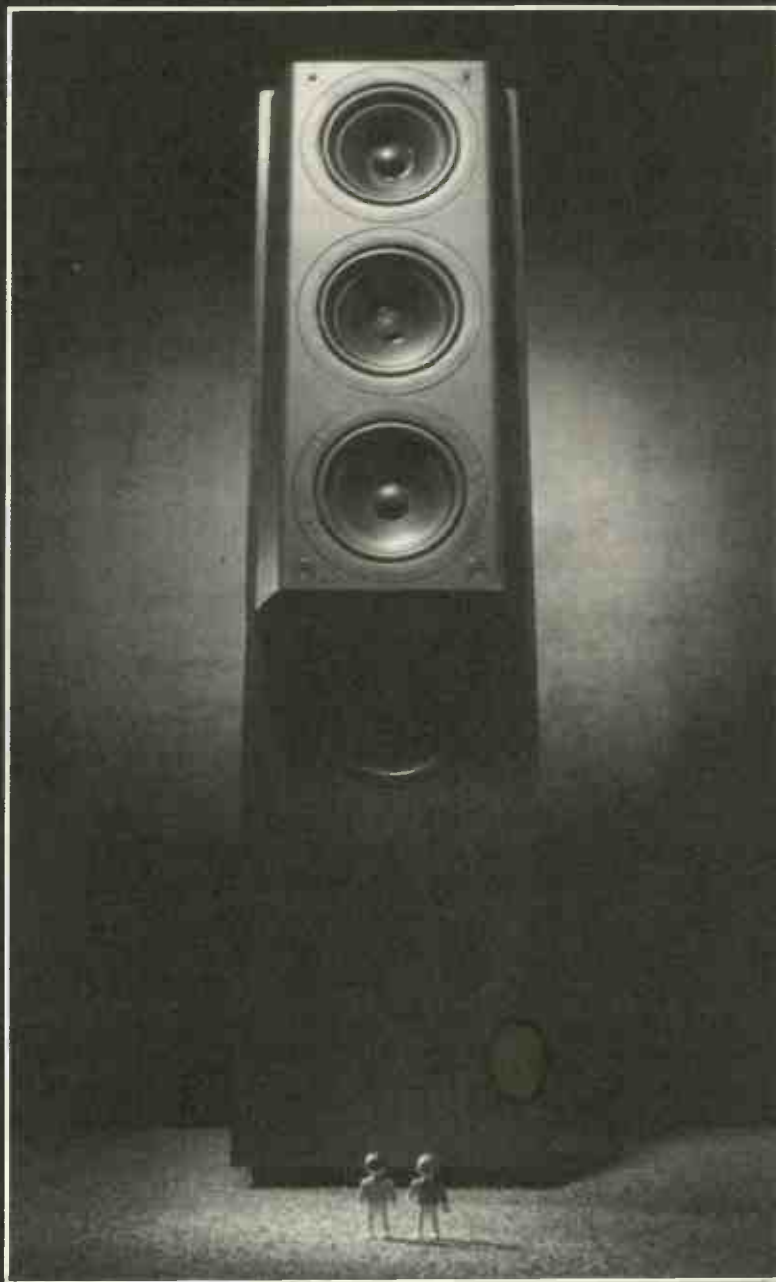
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Mighty *Miniature*

Simon Cooke listens to Richard Allan's new Minette II loudspeakers, budget battlers he took a liking to.

The £120 bracket is a competitive area of the market and a speaker has to offer something quite extraordinary to gain any laurels. These new budget speakers from Richard Allan are priced to compete with the Mission 760is and Tannoy 603s of this world.

The Richard Allan Minette IIs are slightly too tall to fit between bookshelves, so they'll run the risk of being crammed sideways between the volumes, a position in which they will probably perform worse than other small speakers such as the

Goodmans Maxim 3. All the same, compact budget speakers such as these have certain inherent advantages.

As well as being inconspicuous, the proximity of the two drive units to each other represents a near point source, and so gives a coherent and well focused presentation. The speaker cabinets are adequately finished, giving an impression of having had the money spent on the internal workings, rather than simple shoddy workmanship. The front baffle houses the drive units; the rear panel the

reflex port set almost centrally and two respectable looking binding posts. The speakers came with cloth grilles, which I removed out of habit, before wiring them up.

Being of a sadistic nature, I ran the speakers in for the minimum time and then threw them a few curved balls. I was surprised to find how well they coped. These speakers could crack along at an impressive rate, and remained cool through some alarmingly complex drum-work. Tight bass appeared to be their trade mark, highlighting the woolly nature

of the B&W Vision DSI's which are usually used on this system. The B&W's however, had the edge on bass extension. Deep, rumbling bass lines are simply not in the Minettes repertoire, even if you place them a few inches from a solid wall, where you will gain bass extension at the expense of just about everything else. I kept them on stands about 12in away from the wall, where they could give a good punchy track, like Seal's Killer, everything it deserved. The speed slackens slightly as the volume rises, but these are not speakers to worry your neighbours with, and even at their slackest, they will still impress with their responsiveness.

The Richard Allans display a nice midrange, offering a well rounded tone without losing focus. However, if positioned too close to the junction of a partition and a solid wall, or any acoustic hazard, the mid-band stays with the speaker, rising to the lower treble range, where the notes suddenly leap away from the box.

Being something of a subjective reviewer I could not honestly say whether this was due to a suck out or not, but a sharp change in frequency response seems to be the only answer, by suddenly kicking out a large increase in energy, enough to set up resonances. Away from such acoustic booby-traps, this foible passes without notice in any normal usage.

Up among the treble notes is where you will find most of the problems with this design. Generally, these speakers handle transients quite well, but anything more sustained is thin and sinewy, quickly

becoming tiresome on sustained listening. This had another effect on the positioning of instruments; cymbals tended to stay with the drums, spatially, but steel strings and violins had a tendency to shift in and out of the boxes, muddying images.

When taken together, the overall tone

"Up among the treble notes is where you will find most of the problems with this design"

was a fast, exciting one, with rising tones knitting into a comprehensive spectrum, which adds to the overall effect of producing an adequate image of the music. I say that the imaging was adequate, because when on the receiving end of the reference set up, the Richard Allans failed to pull away from their boxes. However, when fed with a DPA led CD system, the imaging was surprisingly good, hanging between the speakers and resolving unexpected amounts of detail. In fact, although not tonally as pure as some, the presentation of the Minettes made a refreshing change, with these little speakers positively revelling in the demands being made on their speed and dynamism, although sometimes lapsing from pace to spit on the sharper drums and cymbals. The image failed to remain totally consistent, with orchestral strings sliding back towards the boxes.

It was a pity that these speakers failed to produce this kind of image with the reference system, since it is unlikely that many pairs will be used on the receiving

end of a DPA DAC and pre/power combo. This experience led me to think that I had been unjust in pairing these speakers with the reference system, although they had the benefit of the requisite amount of bass drive there. Because of their response with the

reference system, I can't honestly say that these speakers give an "out of box" effect. They can be driven that way, but are unable to soar of their own accord.

If you consider buying these speakers, you must account for stands, since the

proximity of a wall causes the sound to become confused and lose tempo. The sound which they transmit is enjoyable and euphonious on first hearing, but beware of positioning and partnering them, because their few failures can make them tiresome to listen to in the long term. They should be adequate to the task of partnering most equipment, but care in this respect could well pay dividends in performance quality.

The new Minettes can sound exceptional; Richard Allan may just have a winner on their hands. But there are so many good rivals out there, which fail to be recognised because only the truly extraordinary is remembered, that I would not like to bet on it ●

Richard Allan Minette II - £120
Richard Allan Audio Ltd.,
Bradford Road,
Gomersal,
Cleckheaton,
W. YORKS BD19 4AZ.
Tel: 0274-872442

MEASURED PERFORMANCE

The Richard Allan Minette IIs are the latest to join the fiercely competitive sub-£150 budget box loudspeaker market. Setting the standard to beat are the Goodmans Maxims, Mission 760is and Celestion Is, to name but a few, so the competition is strong. Sporting a small paper woofer and a plastic tweeter they don't look quite as high tech as their competitors, but the real test is whether they perform sonically.

As far as measurement goes the Richard Allans are a bit of a mixed bag. Their response is quite even, with a slight treble lift which should produce an open and clear sound. There is quite a strong suck-out where the two drivers cross over and in this respect the speakers could have been better engineered. Overlapping the woofer and tweeter a little more accurately would have summed their roll offs, filling this hole. As it is, the loss of information will compromise detailing to a

small extent; such suck outs can result in a euphonic softness, quite liked by some.

There's a small lift up in bass output to 125Hz, but below this frequency output falls off rapidly, so there's little low bass from the Minette (-6dB at 80Hz), as is to be expected from such a small cabinet.

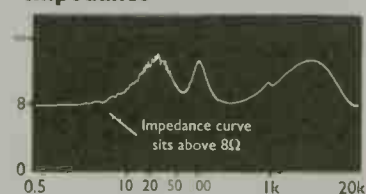
Like most budget miniatures the Minettes are not especially sensitive, producing an average 86dB at 1m for 2.84V of pink noise. However, their overall impedance is high at 11.8Ω so they will not demand high current from an amplifier and this is the reason for mediocre voltage sensitivity. A modern, budget, solid state integrated amplifier should have no problem driving them to high levels within a moderately sized room. DB

Frequency Response



The Minette IIs have an even response, except for a dip at the crossover

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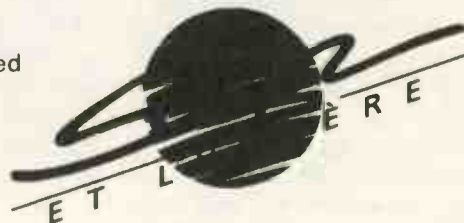
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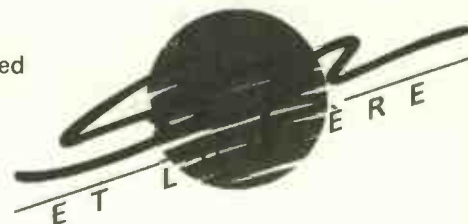
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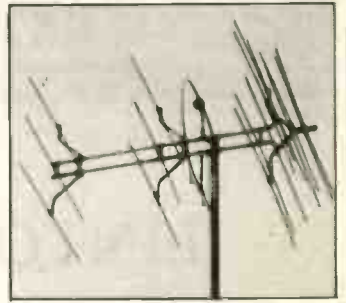
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We've tested powered indoor aerials and expensive hi-tech designs costing up to £50 and find they give no more signal than simple, horizontal dipoles, either of the wire type or of rigid aluminium. Their only benefit is smaller size. It is better to buy a rigid aluminium dipole and mount it high, upstairs on a wardrobe, at the top of a stairwell, or similar.

LOFT AERIALS

Loft aerials have the advantage of height and, if there are many elements, gain as well, so they provide a stronger signal than a simple dipole indoor aerial. In areas of reasonably high signal strength - which usually means within ten miles or so from a transmitter, a loft aerial may be satisfactory.

Usually with three elements, a director rod (short), reflector rod (long) and dipole element in between, loft aerials are also directional; they must be pointed toward the transmitter. They reject interference and reflected signals better than dipoles, giving a cleaner signal to the tuner.

The best mounting position is high up in the V of the roof, away from metal objects like water tanks. A long downlead will be needed, preferably of good quality to minimise signal loss.

BALCONY & WALL MOUNTING AERIALS

Balconies in blocks of flats have the advantage of height, giving a much stronger signal. However, the balcony should face the transmitter for good results.

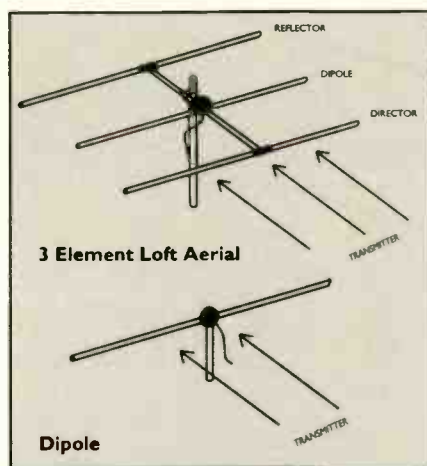
It is often possible, if a little difficult, to wall-mount an aerial on a stub mast outside a window, but you may need consent to do so. Hanging out of a window can be dangerous, so consider using a professional installer. And make sure the wall faces toward the transmitter of course.

OUTDOOR AERIALS

In most locations, only an outdoor aerial will give a signal strong enough and clean enough (i.e. free from interference and multipath reflections) to provide true hi-fidelity from a good tuner. Benefits are height (the higher the better), crucial for

obtaining a strong signal free of reflections, and number of elements, which determine both gain and directionality.

Multi-element aerials are used in areas of medium to weak signal strength, meaning up to around forty miles from a transmitter. Any further away is judged as a 'fringe' area and will demand even more elements.



ALL-ROUND AERIALS AND WHIPS

Whip aerials, vertical dipoles and all-round aerials (curved horizontal dipoles) provide less signal than a simple, indoor dipole (i.e. negative gain). They are suitable only for areas of high signal strength.

Although whips and curved dipoles offer all-round reception, this means they provide little rejection of reflections, interference and distant stations. They are not especially suitable for hi-fi use.

AERIAL AMPLIFIERS AND ROTATORS

Aerial amplifiers are useful only at the masthead to overcome losses in a very long downlead. They are also used to provide enough signal for distribution around a house.

These roles apart, amplifiers boost noise and rubbish from an aerial by the same amount they boost wanted stations, giving no gain in quality, even though the signal strength meter of a tuner might go up. Not recommended.

Rotators are used to swing a directional aerial around, to receive more stations. A simpler solution is to have two aerials pointing in different directions, with their outputs diplexed together or, for more signal but less convenience, twin

downleads with an aerial switch at the bottom.

ATTENUATORS

When it's necessary to use a directional aerial to cut down reflections from tower blocks, but the aerial then gives too much signal (i.e. more than 10mV), an in-line attenuator can be used to prevent tuner overload.

AERIAL INSTALLERS

The best and overriding reason for using an installer is personal safety; roof work is very dangerous. Installers are also very quick and well equipped; DIY may take the large part of a day. Local installers should know about area-specific problems, the location of repeat and fill-in transmitters, and such like - all matters that are likely to be a mystery to most people.

Finally, good installers should have a Field Strength Meter that not only enables them to see whether an aerial is giving the required result, but can prove this to the satisfaction of the customer. Around 1mV is wanted, meaning powerful stations will come in higher (say 3-5mV) but weak ones a bit lower (0.3-1mV). If for no other reason, knowing that the aerial works properly is enough reason for using an installer.

Discuss this matter with them first though. In some areas, it may be impossible to obtain such a strong signal, no matter what aerial is used; get a variety of opinions if necessary.

CONFEDERATION OF AERIAL INDUSTRIES

The CAI has a nationwide list of aerial installers who are members that abide by the rules below.

To find a local service, contact -

CAI Ltd.,
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Fax: 081-903-8719

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MHC2800CO	£459
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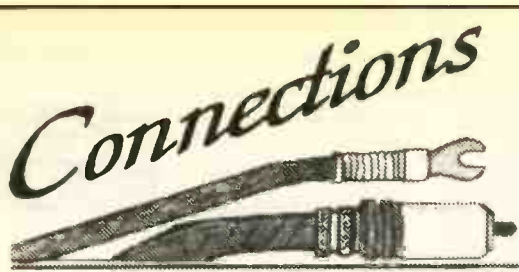
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SME 309	£568	Based on IV and V: Aluminium armtube and detachable headshell. High end value for money.	Jan'93
SME SERIES V	£1232	A masterpiece of precision engineering, with a cohesive sound.	May'92

CARTRIDGES

GOLDRING 1012 GX	£60	Rounded bass, slightly forward midband, clean transients. A bargain.	Jul'93
GOLDRING 1022GX	£80	Extra degree of dynamic range and speed over the 1012GX	Jul'93
SUMIKO BLUE POINT	£100	The blue point casts a romantic charm over all types of music. Robust too.	Oct'92
ORTOFON MC15	£100	Moving coil cartridge at a moving magnet price. Has a tight grip on rhythm.	Jun'92
GOLDRING 1042	£100	A reference to all other MMs regardless of price	May'92
SHURE VST-V	£150	One of the finest moving magnets currently available. Excellent tracker.	Jul'92
GOLDRING ELITE	£200	British made moving coil. Good value, smooth and detailed, but can sound brittle at times.	Apr'92
MORCH DA CAPO	£500	Scan-Tech designed moving coil cartridge. Musical and accurate, without any flaw.	May'92

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NAKAMICHI CR-7	£1500	No Dolby 'S', but auto tape tuning and motorised head. Astonishing complexity; The Best!	Aug'92

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H/K TU9400	£300	Fairly basic facilities, but sound which beats anything at the price.	Jul'93
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NAD 302	£160	Lots of insight and detail, but could sound a little rough in the wrong system.	Jan 93
PIONEER A-300X	£200	Exceptionally sweet mid and treble, plus the superb dynamic range of the A400.	Dec'92
DENON PMA-350II	£220	Powerful and with deep rhythmic bass drive.	Sep'93
H/K HK6550	£349	Thoroughly refreshing, tonally neutral amplifier with a realistic price tag	Nov'92
AUDIOLAB 8000A	£430	Very neutral and superbly built. Good bass, great imagery, but can be sterile.	Apr'92
SUGDEN A48B	£460	Gentle performer, but never masks the music with warmth. Tonally very even.	Apr'92
AUDIONOTE OTO	£1250	12w Valve amplifier. More in tune with music than hi-fi. Superb dynamic range.	Jun'92
EAR 834	£1295	Valve integrated amplifier with a sweet, open and detailed sound.	Feb'93

PRE-AMPLIFIERS

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A. SYNTH. PASSION		£475Or £275 for the kit version. Unrivalled transparency from a passive pre-amp.	Aug 93
DPA DSP 200S	£495	Not quite the 50S, but there's still nothing to match it at the price, use with 200S power.	Jun'93
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E.A.R. YOSHINO	£25,000	Single-ended valve design. Noel is still suffering withdrawal from this product.	Jul'93

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The Sound of Silence.



AX-A662BK

Crosstalk, noise interference, signal degradation. All dirty words as far as we're concerned. That's why the JVC AX-A662BK amplifier has no such vices.

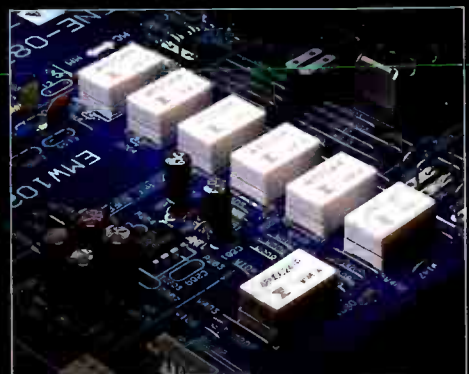
Featuring separate heat sinks and 'Advanced Super A' circuitry for left and right channels coupled with the dramatic reduction of internal wiring, this amplifier is virtually free of such problems.

Designed for the Digital Age.

The benefits? A very special amplifier that delivers a powerful punch, but manages to preserve a certain delicacy and subtlety at low signal levels.

As one Hi-Fi magazine put it - 'The JVC AX-A662BK produces a tidy, neutral, articulate sound with a refined and clean presentation, but is powerful without being unpleasantly assertive'.

Silence is Golden



Obviously... **JVC**

MISSION

because...



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